Attachment A

Mitigation Monitoring and Reporting Program

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MITIGATION MONITORING AND REPORTING PROGRAM for Application No. 231264

No.	Environmental Impacts	Mitigation Measures	Responsibility for Compliance	Method of Compliance	Timing of Compliance
BIOLOGICAL RESOURCES					
BIO-1	Impacts to special status species.	*Pre-construction Surveys.* Prior to commencement of any vegetation removal (including clearing and grubbing), a qualified biologist shall survey the project disturbance area to identify the presence of any special-status species.	Applicant	Include measure as project Condition of Approval (COA). Survey to be submitted to County Planning Department.	Prior to site disturbance
BIO-2	Impacts to special status species and sensitive habitats.	*Areas to Be Protected During Construction.* Prior to initiation of construction activities, a USFWS- and CDFW-approved biologist shall identify areas to be protected with exclusion fencing and all areas requiring monitoring a USFWS- and CDFW-approved biologist. Prior to commencement of construction, high visibility exclusion fencing and/or flagging shall be installed with the assistance of a qualified biologist to indicate the limits of work and prevent inadvertent grading or other disturbance within the adjacent sensitive habitat areas. A. No work-related activity including equipment staging, vehicular access, grading and/or vegetation removal shall be allowed outside the designated limits of work. B. Native trees to be retained near or within the project impact area shall be identified, protected with high visibility fencing at or outside of the dripline, and avoided during construction as sensitive habitat unless additional protection measures, provided by a qualified arborist, have been reviewed and approval by Environmental Planning Staff. C. The fencing shall be inspected and maintained daily until project completion.	Applicant responsible for hiring qualified biologist and obtaining agency approval	Include measure as project COA. Compliance monitored by the County Planning Department.	Installation of fencing to be completed prior to site disturbance with maintenance and inspection throughout construction
BIO-3	Impacts to special status species and sensitive habitats.	*Exclusion Fencing.* Prior to initiation of construction activities, the construction contractor shall install exclusion fencing (solid silt fencing) in specified areas along the work area boundaries, 6 inches below grade and 3.0 feet above grade, with wooden stakes at intervals of not more than 12 feet. The fence shall be maintained in working order for the duration of construction activities.	Applicant	Include measure as project COA. Compliance monitored by the County Planning Department.	Installation to be completed prior to site disturbance with maintenance and monitoring throughout construction as

No.	Environmental Impacts	Mitigation Measures	Responsibility for Compliance	Method of Compliance	Timing of Compliance
		• The USFWS-approved biologist or designated trained construction monitor shall inspect the fence daily and notify the construction foreman when fence maintenance is required. • The fence shall allow for wildlife passage across the work area at intervals to be determined in conjunction with USFWS and CDFW.			specified in measure
BIO-4	Impacts to special status species and nesting birds.	*Construction Worker Training.* Prior to commencement of construction every individual working on the Project must attend biological awareness training by a USFWS-approved biologist prior to working on the job site. The training shall include at minimum information regarding the following: A. Location and identification of sensitive habitats and all special-status species with potential to occur in the project area including information specific to identifying these species, including a description of CRLF and its habitat, and measures to protect CRLF, and other sensitive wildlife species known or with potential to occur (western pond turtle, nesting avian species, San Francisco dusky-footed wood rat, and roosting bats) in the project study area. B. The importance of avoiding impacts to special-status species and their habitat, penalties for damaging habitat, and the steps necessary if any special-status species is encountered at any time. C. Best management practices to be implemented, identification of the limits of work, and project-specific avoidance measures and permit conditions that must be followed.	Applicant responsible for hiring qualified biologist and obtaining agency approval	Include measure as project COA. Compliance monitored by the County Planning Department.	Prior to construction mobilization, site disturbance, and grading
BIO-5	Impacts to special status species.	*Biological Monitoring During Construction*. A qualified USFWS-approved biologist shall be on site to monitor all initial clearing and grubbing and ground-disturbing activities associated with the project. A. A single person on the jobsite (either the qualified biologist or a designated daily monitor) shall be responsible for daily monitoring activities which shall include: 1. Checking under all equipment for wildlife before use. 2. Inspecting all trenches, pipes, culverts or similar structures for animals prior to burying, capping, moving, or filling. 3. Ensuring that at the end of each workday, all excavations shall be secured with a cover, or a ramp installed to prevent wildlife entrapment.	Applicant responsible for hiring qualified biologist and obtaining agency approval	Include measure as project COA. Compliance monitored by the County Planning Department.	During site disturbance and grading and throughout construction as specified in measure
BIO-6	Impacts to special status species.	*Construction Timing.* If feasible, construction activities in and adjacent to the sloughs shall take place during the dry season and before the first rain of the season, especially vegetation removal.	Applicant	Include measure as project COA. Compliance monitored	During site disturbance and grading as specified in

No.	Environmental Impacts	Mitigation Measures	Responsibility for Compliance	Method of Compliance	Timing of Compliance
		Avoid working at night or during rain events when special-status amphibians and mammals are generally more active. Consult weather forecasts from the National Weather Service at least 72 hours prior to performing work.		by the County Planning Department.	measure
BIO-7	Impacts to special status species.	*California Red-Legged Frog (CRLF) and Western Pond Turtle (WPT) Protection Measures*. A. During vegetation removal in or adjacent to the sloughs, with the authorization of the USFWS and CDFW, the agency-approved biologist will be present (or on call) to relocate CRLF (and WPT) as needed. The approved biologist shall have the authority to stop work that may result in the "take" of a special-status species. The biologist will thoroughly check all vegetation for CRLF, WPT, and other wildlife species prior to vegetation removal activities. B. The approved biologist or construction monitor will check under all equipment for wildlife before use. If any special-status wildlife is observed under equipment or within the work area, the approved biologist will be permitted to handle and relocate it. C. At the end of each work day, excavations shall be secured with a cover, or a ramp installed to prevent wildlife entrapment. D. All trenches, pipes, culverts or similar structures shall be inspected for animals prior to burying, capping, moving, or filling.	Applicant responsible for hiring qualified biologist and obtaining agency approval	Include measure as project COA. Compliance monitored by the County Planning Department.	During site disturbance, vegetation removal and throughout construction and grading as specified in measure.
BIO-8	Impacts to special status species.	To minimize take of CRLF during maintenance activities, restrict mowing and pruning to the dry season, after April 15 if feasible, or wait at least 2 weeks after March or April rains.	Applicant	Include measure as project COA. Compliance monitored by the County Planning Department.	During site maintenance as specified in measure.
BIO-9	Impacts to special status species.	To minimize vehicle strikes of CRLF, if feasible, restrict parking to daytime hours.	Applicant	Include measure as project COA. Compliance monitored by the County Planning Department.	During construction.
BIO-10	Impacts to special status species.	*San Franciso Dusky-Footed Woodrat Pre-construction Survey*. Prior to construction, a qualified biologist shall conduct a preconstruction survey for woodrat houses, and clearly flag all houses within the construction impact area and immediate surroundings. • The construction contractor shall avoid woodrat houses to the extent feasible by installing a minimum 10-foot (preferably 25-foot) buffer with silt fencing or other material that shall prohibit encroachment.	Applicant responsible for hiring qualified biologist and obtaining agency approval, if needed, as specified in measure	Include measure as project COA. Survey to be submitted to County Planning Department	Prior to site disturbance

No.	Environmental Impacts	Mitigation Measures	Responsibility for Compliance	Method of Compliance	Timing of Compliance
		• If this buffer and avoidance is not feasible, the qualified biologist shall allow encroachment into the buffer, but preserve microhabitat conditions such as shade, cover and adjacent food sources. • If avoidance of woodrat houses is not possible, in coordination with CDFW, a qualified biologist shall develop and implement a San Francisco Dusky-footed Wood rat Relocation Plan.			
BIO-11	Impacts to special status species.	*Bat Protection Measures*. If feasible conduct limbing/tree removal operations between September 15 and November 1 to avoid bat maternity roosts and winter hibernacula, as well as other sensitive biological resources.	Applicant	Include measure as project COA. Compliance monitored by the County Planning Department.	Prior to tree limbing or removal between November 1 and September 15
BIO-12	Impacts to special status species.	*Bat Protection Measures*. To avoid impacts to individual roosts, winter hibernacula, and maternity roosts, during all months, prior to limbing/tree removal, or rehabilitation of the steel barn a qualified biologist shall conduct a pre-construction survey for bats to determine if crevice or foliage roosting bats are present, as follows: • A qualified biologist shall determine if bats are utilizing the site for roosting. For any buildings or trees/snags that could provide roosting space for cavity or foliage-roosting bats, potential bat roost features shall be thoroughly evaluated to determine if bats are present. Visual inspection and/or acoustic surveys shall be utilized as initial techniques. • If roosting bats are found, the biologist shall develop and implement acceptable passive exclusion methods in coordination with or based on CDFW recommendations. If feasible, exclusion shall take place during the appropriate windows (September land November 1) to avoid harming bat maternity roosts and/or winter hibernacula. (Authorization from CDFW is required to evict winter hibernacula for bats). • If established maternity colonies are found, in coordination with CDFW, a buffer shall be established around the colony to protect pre-volant young from construction disturbances until the young can fly; or implement other measures acceptable to CDFW. • If a building or tree is determined not to be an active roost site for roosting bats, proceed with work immediately. For trees to be limbed or removed, proceed as follows: ◆ If foliage roosting bats are determined to be present (e.g. hoary bat or western red bat), limbs shall be lowered, inspected for bats by a bat biologist, and chipped immediately or moved to a dump site. Alternately, limbs	Applicant responsible for hiring qualified biologist and obtaining agency approval, if needed, as specified in measure	Include measure as project COA. Survey to be submitted to the County Planning Department.	Prior to tree limbing or removal or construction as specified in measure

No.	Environmental Impacts	Mitigation Measures	Responsibility for Compliance	Method of Compliance	Timing of Compliance
		may be lowered and left on the ground until the following day, when they can be chipped or moved to a dump site. No logs or tree sections shall be dropped on downed limbs or limb piles that have not been in place since the previous day. ◆ If the tree is not limbed or removed within four days of the survey, the survey efforts shall be repeated.			
BIO-13	Impacts to special status species and nesting birds.	*Nesting Birds.* The avian breeding season occurs between February 1 and September 1. If feasible, perform vegetation removal activities outside of breeding bird season to avoid direct harm or mortality to potential nesting bird species and other sensitive biological resources. For all project activities initiated during the breeding bird season, or if construction activities lapse for a period of one weeks or more during breeding bird season, a qualified biologist will conduct a breeding bird survey for nesting birds, including raptors. The survey will include potential habitat for raptors and sensitive and common nesting avian species known to occur within the Study Area. • Surveys will be conducted within 7 days, prior to beginning construction activities and will include all work, staging, access areas, and minimum survey radii surrounding the work area as follows: ◆ 250 feet for non-raptors; ◆ 500 feet for small raptors such as accipiters; and ◆ 1,000 feet for larger raptors such as buteos. • If no nesting sensitive or common avian species are observed during breeding bird surveys no additional measures would be required. • If common nesting birds are observed within or adjacent to vegetation proposed for removal, postpone vegetation removal activities until young have fledged to avoid direct harm or mortality of nesting birds and/or establish buffers depending on the activity and appropriate to the species. • Sensitive bird species, if nesting in or near the Project Area, will be given special consideration and may require additional protective measures as determined through consultation with the relevant agency (USFWS or CDFW): ◆ Bald eagle, golden eagle: 1,300 feet; ◆ Northern harrier, white-tailed kite, and other raptors: 300 feet; ◆ Lawrence's goldfinch, grasshopper sparrow, yellow warbler: 75 feet; and	Applicant responsible for hiring qualified biologist and obtaining agency approval, if needed, as specified in measure	Include measure as project COA. Survey to be submitted to the County Planning Department.	Prior to vegetation removal and site disturbance as specified in measure

No.	Environmental Impacts	Mitigation Measures	Responsibility for Compliance	Method of Compliance	Timing of Compliance
		◆ Oak titmouse, olive-sided flycatcher: 50 feet. A qualified biologist will monitor active nest sites for construction-related disturbances and adjust protective buffers as necessary to prevent further disruption of nesting activities.			
BIO-14	Impacts to special status species.	S*ensitive Bird Species*. The following measures will be implemented as Best Management Practices to protect wintering sensitive bird species, if present: • If any work is performed during the burrowing owl and tricolored blackbird wintering period (November - March), conduct a survey for these species. • The survey will be conducted by a qualified biologist and include the project area and suitable habitat within 150 meters (490 feet). • If burrowing owls are detected: ◆ Place visible markers near occupied burrows and fence off suitable habitat; ◆ Avoid direct destruction of burrows, and ◆ Include the burrowing owl in the environmental training for construction personnel ◆ To avoid potential burrowing owl habitat, to the greatest extent feasible, avoid destruction of fossorial mammal burrows during construction. • CDFW may require additional protective measures for wintering tricolored blackbirds, if observed.	Applicant responsible for hiring qualified biologist	Include measure as project COA. Survey to be submitted to the County Planning Department.	Prior to vegetation removal and site disturbance as specified in measure
BIO-15	Impacts to special status species.	*Control Lighting.* To reduce potential impacts to sensitive habitats and special-status species that may result from artificial light, the following shall be adhered to: A. The project shall avoid the installation of any non-essential artificial lighting. If artificial lighting is necessary, the project shall avoid or limit the use of artificial lights during the hours of dawn and dusk, when many wildlife species are most active. B. All essential outdoor lighting shall be limited through the use of timers and/or motion sensors. C. All essential outdoor lighting shall be shielded, cast downward, and directed such that it does not shine off the property into surrounding areas, other parcels, or the night sky.	Applicant	Include measure as project COA. Compliance monitored by the County Planning Department.	During construction and project operations
BIO-16	Impacts to special status species.	*Special Status Species Encountered During Construction*. If any individual special-status species is found at any time prior to or during construction, work shall cease immediately in the vicinity of the individual and likely to be injured or killed by work activities, it	Applicant responsible for hiring qualified biologist and	Include measure as project COA. Compliance monitored by the County	During construction

No.	Environmental Impacts	Mitigation Measures	Responsibility for Compliance	Method of Compliance	Timing of Compliance
		shall either be allowed to move out of harm's way on its own or a qualified biologist, with the authorization of the USFWS and CDFW, shall move it to the nearest suitable habitat outside of the project impact area. The biologist shall be allowed enough time to move any special-status species from the site before work activities begin.	obtaining agency approval, if needed, as specified in measure	Planning Department.	
BIO-17	Impacts to special status species.	*Western Pond Turtle Discovery*. If a western pond turtle egg clutch is discovered during pre-construction surveys, or at any time during construction, work in the vicinity of the egg clutch shall be halted immediately. Unless otherwise advised by CDFW, the nest location shall be surrounded with high visibility fencing under the guidance of a qualified biologist and shall be avoided until the biologist determines that the clutch has hatched and individuals are no longer likely to be injured by work activities.	Applicant responsible for hiring qualified biologist and obtaining agency approval, if needed, as specified in measure	Include measure as project COA. Compliance monitored by the County Planning Department.	During pre-construction surveys, site disturbance and construction
BIO-18	Impacts to sensitive habitats.	*Sensitive Habitat Replacement*. To comply with Santa Cruz County General Plan Policy 5.1.12, SCCC Section 16.32.090 (C)(1)(a), and to compensate for impacts to Coastal Scrub, Coast Live Oak Woodland, Mixed Willow Riparian, Seasonal Wetlands, Freshwater Marsh, and Aquatic Habitat (Hanson Slough) and inadvertent impacts that will result from future use of the project site, the following shall be adhered to: A. All areas temporarily disturbed as a result of the project shall be restored to pre-project contours to the maximum extent possible and re-vegetated with native plant species appropriate to the habitat disturbed. B. All sensitive habitats permanently impacted as a result of the project shall be compensated for at a minimum 2:1 ratio through restoration or establishment of in-kind habitat at designated restoration areas on site. C. A Habitat Restoration Plan prepared by a qualified biologist or restoration specialist shall be submitted to, and approved by, the County Environmental Coordinator prior to the final CEQA determination.	Applicant	Include measure as project COA. Habitat Restoration Plan to be submitted to the County Planning Department.	Prior to site disturbance for preparation of the Habitat Restoration Plan with implementation after construction in accordance with provisions of the Plan

Attachment B

County of Santa Cruz Biotic Report Review
With
Biological Resources Assessment Report

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County of Santa Cruz

DEPARTMENT OF COMMUNITY DEVELOPMENT AND INFRASTRUCTURE

701 OCEAN STREET, FOURTH FLOOR, SANTA CRUZ, CA 95060-4070
Planning (831) 454-2580 Public Works (831) 454-2160

Matt Machado, Deputy CAO, Director of Community Development and Infrastructure

May 2, 2024

Land Trust of Santa Cruz County
Attn: Bryan Largay
617 Water Street
Santa Cruz, CA 95060

Subject: 275 Lee Road Biotic Report Review and Conditioned Biotic Approval
APN: 052-081-34, 052-081-35, and 052-081-37
Application #: REV231100; 231264

Attachment 1. Biotic Assessment Report

Dear Mr. Largay,

Santa Cruz County Planning received and reviewed a Biotic Assessment Report dated May 2023 (Updated February 2024), prepared by EcoSystems West Consulting Group for APNs 052-081-34, 052-081-35, and 052-081-37. This report is included as Attachment 1. A Biotic Report Review is required because of the potential for sensitive habitats and protected species on these parcels where infrastructure improvements associated with the Watsonville Slough Farm Community Harvest Program are proposed.

Watsonville Slough Farm is a 490-acre working farm, actively cultivated in industrial scale organic row cropping. The property is owned by the Land Trust of Santa Cruz County and managed with the combined goals of preserving agricultural land, restoring coastal ecosystems, and connecting people with nature.

The Watsonville Slough Farm Community Harvest Program is a visitor access and education program intended to increase access to, and understanding about, healthy food for members of the local community. The program would allow managed visitor access to the property, under the supervision of onsite caretakers. Guests will be able to harvest and gather in-season fruits and vegetables in designated harvest areas and learn about the Land Trust's sustainable management practices, organic agriculture, and the surrounding Watsonville slough ecosystem while walking on a designated trail network that traverses the farm.

New facilities for the program are proposed largely on existing developed/previously disturbed areas of the farm. Existing domestic wells will be used for new facilities and existing septic systems will be used, expanded, or rebuilt as needed. The program utilizes an extensive network of existing trails and access roads on the farm. Several short new trail segments are proposed to connect existing trails to each other in areas where the existing trail system is currently connected only through use of working farm roads. Installation of several nature viewing platforms overlooking the slough and other trail and access improvements are also proposed.

The Program activities and associated infrastructure improvements are proposed primarily in two parts of the farm: the Community Harvest Gateway Area, a large previously developed area accessed from Lee Road, and the existing Little Bee Barn Area accessed off Harkin's Slough Road. The designated walking trail network will connect these two areas.

Farmworker Housing

The project proposes to install four RV trailer-type single bedroom farmworker housing units including one designated caretaker's quarters and three additional dwelling units. These units will be installed in two previously developed areas on site where existing hardscaped parking areas, water, electrical and septic system used for former residences will be repurposed for use by these units.

Improvements to the Community Harvest Gateway and Cypress Hilltop Area

The Community Harvest Gateway area is located at the main entrance of the farm with driveway accessed from Lee Road. Proposed development in this area includes driveway improvements, installation of fencing, gates, and signage; parking area, bus drop-off area, electrical vehicle charging stations, farm stand, produce washing and preparation facilities, sidewalks and pervious concrete walking surfaces, lighting, and stormwater management structures; picnic areas, restrooms, rehabilitation or replacement of an existing 80-foot by 60-foot steel barn, community gardens and orchard spaces, ADA accessible trails, walking paths, and landscaping. A caretaker unit and one farmworker housing unit will also be installed in this area.

The Cypress Hilltop Area, which is located a short trail walk from the Community Harvest Gateway area, will include an overlook with a picnic area, restroom, shade structure, and will require access improvements to the existing dirt road. Existing water and septic from a former residence at this site will be used for these facilities.

Improvements to the Little Bee Barn Area

The Little Bee Barn Area includes the existing Little Bee Barn, several additional outbuildings, and an existing disturbed area used for agricultural operations on the farm. Two farmworker housing units will be installed in a previously developed location in this area of the farm.

The Little Bee Barn area is currently accessed off Harkins Slough Road via a dirt driveway with a steep hill which becomes inaccessible during the rainy season. The project will realign the entrance to this part of the property to improve access. The new entrance road will connect to a different point on Harkins Slough Road and will require a new driveway transition, signage, and fencing installed at the entrance.

Community Harvest Areas

Community Harvest Areas will be established in existing agricultural areas along the trail system to provide the best access for visitors to harvest fresh fruits and vegetables. These areas will be planted with crops such as orchard trees, berry bushes, nopales, flowers, and perennial herbs as well as some row crops as grower operations allow.

Trail Improvements

The program will primarily utilize existing agricultural roads and existing walking paths for guests. The proposed project includes some improvements to these existing paths, installation of interpretive signage, establishment of several new sections of footpath, installation of two boardwalks, and construction of three observation platforms overlooking Hanson's Slough. Several new sections of footpath are needed to re-direct the trail network around some working farm roads for the safety of pedestrians.

Three observation platforms are proposed to allow guests to make observations of Hanson's Slough. These platforms are intended to allow small groups to gather near the water's edge without trampling vegetation. Interpretive signage will be installed throughout the trail network.

Two pedestrian boardwalks will be built over existing walking paths that are frequently submerged during the winter months. These boardwalks have been designed to include invasive fish screens beneath them so that the structures will serve two purposes: to maintain trail access during high water conditions, and to improve habitat for California red-legged frogs (CRLF) by preventing invasive non-native fish from entering the parts of the slough upstream of these structures. These upstream areas currently support potential breeding habitat for CRLF, but the presence of invasive fish significantly impairs breeding. The boardwalks will create two areas (1.1-acres and 9.0-acres) of fish-free wetlands when inundation occurs during the frog breeding season.

The attached Biotic Assessment Report and Community Harvest Program Statement provide additional detail about the Watsonville Slough Farm Community Harvest Program and associated facility improvements. Figure 2 in the Biotic Report shows the locations of the proposed facility improvements.

Baseline Environmental Conditions

The summary and evaluation below are based on information obtained through review of the attached Biotic Assessment Report and confirmed through observations made by County Environmental Planning Staff during a field visit on November 30, 2023. Other sources consulted during report review include the California Natural Diversity Data Base (CNDDB), the United States Fish and Wildlife Service (USFWS) Environmental Online Conservation System (ECOS), Santa Cruz County GIS Maps, the 2012 Watsonville Slough Farm Management Plan, and aerial imagery of the project site.

The Watsonville Slough Farm is a 490-acre property owned by the Land Trust of Santa Cruz County. The property was purchased by the Land Trust in 2009 and protected from development in perpetuity with funding for acquisition from the State Coastal Conservancy and Wildlife Conservation Board. Restoring coastal ecosystems is a primary goal of the Land Trust's management efforts at the Watsonville Slough Farm. The property has been the subject of extensive habitat restoration efforts, including direct planting of riparian forest, coast live oak coastal scrub, wetland, and coastal prairie grassland vegetation.

The property has approximately 240 acres of certified organic farm fields, 240 acres of wetland, woodland, and grassland habitats, and approximately 10 acres of existing hardscaping and disturbed land associated with former residences, outbuildings, access, and agricultural operations. Some residential structures and other buildings were removed in 2019, but the utilities (water, septic, power) were retained at multiple locations.

The property is situated on the terraces and slopes adjacent to, and above, the greater Watsonville Sloughs system which is one of the largest remaining freshwater marshlands in the State's coastal zone. This slough system has six interlinked, freshwater sloughs. The farm encompasses the East Branch and West Branch of Hanson Slough to its confluence with Struve Slough, and abuts Struve Slough to the southeast and south, Watsonville Slough to the south, and Harkins Slough to the west.

The Study Area covered in the Biotic Report includes the portions of the farm where Program development activities are proposed (Gateway, Little Bee Barn, Caretaker/Farmworker Housing Sites, Cypress Hilltop Picnic Area, and access roads and trails), and a minimum buffer of 150-feet extending around these areas. Within the study area, the "project site" consists of the approximate location where proposed development would occur.

The Biotic Report identifies eleven habitat types within the Study Area: non-native grassland, restored native grassland, coast live oak woodland, coastal scrub, mixed willow riparian and wetland forest, palustrine emergent wetlands and scrubshrub wetlands, aquatic, agricultural fields, ornamental trees, ruderal, and developed. Figure 3 of the attached Biotic Assessment Report shows the locations of these different habitat types.

The majority of the Study Area consists of agricultural fields, ruderal habitats, developed areas, and nonnative grassland. These areas have experienced heavy, ongoing, or periodic human disturbance from continuous agricultural operations on the farm for at least a century. These disturbed areas are interspersed throughout the study area with a mosaic of native habitats including mixed willow riparian and various types of emergent wetlands associated with the aquatic sloughs as well as upland areas of coast live oak woodlands and coastal scrub. These native habitats are generally dominated by native plant species, but ongoing human disturbance has altered the species composition in these areas so that non-native species are common and sometimes dominant.

The restored coastal prairie grassland in the Study Area is located immediately northwest of the confluence of Struve Slough and the West Branch of Hanson Slough. These restored native grasslands are the result of the Land Trust's recent restoration efforts to convert degraded fallow agricultural fields back to native coastal prairie through partnership with Watsonville Wetlands Watch and the Santa Cruz County Resource Conservation District.

Analysis

Coast live oak woodland, coastal scrub, riparian, wetlands, aquatic habitats, and habitat for special-status species are considered sensitive under Santa Cruz County's Sensitive Habitat Protection Ordinance (Chapter 16.32). Biological Resources including special-status species and their habitats and other sensitive natural communities as identified by local policies, California Department of Fish and Wildlife (CDFW), or United States Fish and Wildlife Service (USFWS) are also protected under the California Environmental Quality Act (CEQA), the California Endangered Species Act, the Federal Endangered Species Act, and are offered special protections under the California Coastal Act as Environmentally Sensitive Habitat Areas (ESHA).

Aquatic habitats and their riparian corridors (as defined by Santa Cruz County Code Section 16.30.030) are granted additional special protections under the County's Riparian Corridor and Wetlands Protection ordinance (Chapter 16.30). Development activities are prohibited within Riparian Corridors unless Riparian Exception Findings (SCCC 16.30.060) are met, and a Riparian Exception is approved by County Planning.

Many aquatic habitats are also regulated under the Clean Water Act Section 404 by U. S. Army Corps of Engineers (USACE) below the ordinary high water mark (OHWM), and Section 401 by the Regional Water Quality Control Board (RWQCB). The bed and banks are regulated under California Fish and Game Code Section 1602 and may be subject to regulation under the Porter-Cologne Water Quality Act as "Waters of the State".

Sensitive Habitats

The majority of the proposed project site is located in existing developed areas and areas dominated by ruderal and nonnative grassland species. Impacts to sensitive habitats would result from installation of two boardwalks, three observation platforms, several small segments of new natural surface trail, as well as improvements to an existing access road. Temporary impacts will occur during project construction for access and installation of project features. In addition, increased human presence through implementation of the Program has the potential to cause some degradation to sensitive habitats.

Permanent impacts to sensitive habitats will occur from installation of new features including the viewing platforms, boardwalks, and new trail segments. These impacts are outlined in detail in Section 7.2 of the attached Biotic Assessment Report and are summarized below:

Coastal Scrub: Approximately 0.01 acres (575 square feet) due to trail improvements
Coast Live Oak Woodland: Approximately 0.02 acres (1,000 square feet) due to trail improvements. No oak trees are proposed for removal.
Mixed Willow Riparian: Approximately 0.03 acres (1,450 square feet) due to Boardwalk Crossings A and B, new trail segments adjacent to Chives Pond, and the northern viewing platform.
Seasonal Wetlands: Approximately 0.01 acres (390 square feet) due to trail construction and construction of Boardwalk Crossing B.

Freshwater Marsh: Approximately 0.05 acres (1,450 square feet) due to trail construction and construction of Boardwalk Crossing B, the southern viewing platform, and road improvements for access to the Cypress Hilltop Picnic Area.

Aquatic Habitat (Hanson Slough): Approximately 0.01 acres (475 square feet) due to the piers and deck of Boardwalk Crossing B.

The project has been designed to avoid and minimize impacts to sensitive habitats. Unavoidable impacts to Coastal Scrub, Coast Live Oak Woodland, Mixed Willow Riparian, Seasonal Wetlands, Freshwater Marsh, and Aquatic Habitat will be compensated for through enhancement, restoration, and creation of in-kind native habitats on-site including planting additional native plants and trees, removing invasive non-native plants, and planting native understory species in willow riparian and oak woodland habitats. Conditions have been included below to ensure that impacts to sensitive habitats are avoided, minimized, and adequately mitigated.

Portions of the project will occur within County defined riparian corridors. Environmental Planning has determined that the project meets the County's findings for a Riparian Exception (SCCC 16.30.060), and Draft Findings are included below.

Special-Status Species

Focused rare-plant surveys were conducted in the Study Area during the evident and identifiable period for special-status plants with potential to occur. No sensitive plant species were identified within the Study Area. No impacts to sensitive plant species are anticipated to result from the proposed Project. The entire parcel is located within designated Critical Habitat for Santa Cruz tarplant. However, numerous rare plant surveys have occurred within the Study Area, and on adjacent properties, and no Santa Cruz tarplant have been observed in the vicinity of the project site since the early 1990s.

Minor impacts to potential habitat for Santa Cruz tarplant (currently occupied by non-native grassland) will not cause a significant impact to Critical Habitat for this species.

The study area supports suitable habitat for special-status wildlife species including Federally Threatened California red-legged frog; State Endangered bald eagle*;* State Threatened tri-colored blackbird; State Fully Protected golden eagle, American peregrine falcon, and white-tailed kite; and the following State Species of Special Concern: western pond turtle, northern harrier, western burrowing owl, olive-sided flycatcher, yellow warbler, grasshopper sparrow, western red bat, and San Francisco dusky-footed wood rat.

Additionally, the study area provides potential nesting habitat for birds of prey, and migratory birds protected under the California Fish and Game Code, and the Federal Migratory Bird Treaty Act (MBTA). Under the MBTA, it is "unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill" a migratory bird unless and except as permitted by regulations.

Construction activities have the potential to cause direct and indirect impacts to special-status wildlife. These impacts are discussed in detail in the attached Biotic Assessment Report. The Project also has the potential to increase the amount of artificial night lighting on the Project site which may negatively affect fish and wildlife resources. Conditions have been included below to ensure protection of special-status species during and after project construction. Unavoidable impacts to habitat for special status species will be mitigated through on-site enhancement, restoration, and creation of native habitats including establishing two areas of CRLF breeding habitat through installation of fish exclusion screens in the west and east branches of Hanson Slough.

Conclusion

Restoring coastal ecosystems is a primary goal of the Land Trust's management efforts at the Watsonville Slough Farm. The property has been the subject of extensive habitat restoration efforts, including direct planting of riparian forest, coast live oak woodland, coastal scrub, wetland, and coastal prairie grassland vegetation. Compensatory restoration resulting from this project will be a continuation of these efforts. Further, the Watsonville Slough Farm Community Harvest Program will offer a unique opportunity for visitors to see these active native habitat restoration projects side by side with environmentally sustainable agricultural practices.

The majority of the proposed project is located within existing developed areas on the farm and areas dominated by ruderal and nonnative grassland species. The project has been designed to avoid and minimize impacts to sensitive habitats and protected species to the maximum extent possible including measures built into the program design to reduce potential impacts that may result from increased human presence. Limited unavoidable impacts to sensitive habitats would result from installation of two boardwalks, observation platforms, improvements to an existing access road, and several small segments of new natural surface trail.

All temporarily impacted areas must be re-planted with native species. Conditions for habitat restoration to compensate for unavoidable permanent impacts have been included below. Habitat restoration activities associated with the project will result in a net increase in wetland and riparian habitat.

Portions of the project will occur within County defined riparian corridors including the viewing platforms, boardwalks, and trail improvements. Environmental Planning has determined that the project meets the County's findings for a Riparian Exception (SCCC 16.30.060), and Draft Findings are included below.

Riparian Exception Findings

1. That there are special circumstances or conditions affecting the property.
The property is owned by the Land Trust of Santa Cruz County and managed with the combined goals of preserving agricultural land, restoring coastal ecosystems, and connecting people with nature. The property is protected from residential and commercial development and has been the subject of extensive habitat restoration efforts, including direct planting of riparian forest and wetlands.

2. That the exception is necessary for the proper design and function of some permitted or existing activity on the property.
The proposed improvements are part of an existing working farm including the network of existing agricultural access roads and walking trails that traverse the farm fields. New features such as viewing platforms and boardwalks will allow continued and improved pedestrian use of these trails.

3. That the granting of the exception will not be detrimental to the public welfare or injurious to other property downstream or in the area in which the project is located.
The project will benefit the public through increased access to fresh fruits and vegetables, education about sustainable agriculture, and connecting people with nature. The project has been designed to avoid and minimize impacts to aquatic habitat as much as possible during construction, and any exposed soil will be stabilized with standard erosion BMPs to ensure no downstream sedimentation occurs.

4. That the granting of the exception, in the Coastal Zone, will not reduce or adversely impact the riparian corridor, and there is no feasible less environmentally damaging alternative.
The project will not reduce or adversely impact any riparian corridors. Construction related environmental impacts have been avoided or minimized to the maximum extent possible and the finished project will have an overall benefit to the environment.

5. That the granting of the exception is in accordance with the purpose of this chapter, and with the objectives of the General Plan and elements thereof, and the Local Coastal Program Land Use Plan.
The granting of the exception is in accordance with the purpose of the Riparian Corridor and Wetlands Protection Ordinance, and with the objectives of the General Plan. The project has been designed to minimize impacts to the riparian corridor and sensitive habitat as defined in the Santa Cruz County Code Sections 16.30 and 16.32 to the maximum practicable extent and habitat restoration activities associated with the project will result in a net increase in wetland and riparian habitat.

There are constraints on the project site associated with sensitive habitats and protected wildlife species that must be considered prior to and during project implementation.

Conditions have been included below to ensure that proposed development is consistent with County policies and that the project will avoid, minimize, and mitigate impacts to sensitive habitats and special-status species.

A copy of this biotic approval, including attachments, must be submitted with any future permit applications.

If you have any questions regarding this letter, please feel free to contact me via email at Juliette.Robinson@santacruzcounty.us.

Sincerely,

Juliette Robinson
Resource Planner IV, Biologist

CC: Leah MacCarter, Area Resource Planner
Randall Adams, Project Planner
Matt Johnston, Environmental Coordinator

Conditions of Approval

In order to conduct development activities on APNs 052-081-34, 052-081-35, and 052-081-37 the Conditions of Approval I-XI below shall be adhered to. These Conditions shall be incorporated into all phases of development for this project (231264). Adherence to these conditions will ensure that proposed development is consistent with County policies and will reduce impacts to sensitive habitats and special-status species.

I. To reduce potential impacts to sensitive habitats and special-status species that may result from artificial light, the following shall be adhered to:

   A. The project shall avoid the installation of any non-essential artificial lighting. If artificial lighting is necessary, the project shall avoid or limit the use of artificial lights during the hours of dawn and dusk, when many wildlife species are most active.

   B. All essential outdoor lighting shall be limited through the use of timers and/or motion sensors.

   C. All essential outdoor lighting shall be shielded, cast downward, and directed such that it does not shine off the property into surrounding areas, other parcels, or the night sky.

II. Prior to any site disturbance, a pre-construction meeting shall be conducted. The purpose of the meeting will be to ensure that the biotic Conditions of Approval are communicated to the various parties responsible for constructing the project. The meeting shall involve all relevant parties including the project proponent, construction supervisor, Environmental Planning Staff, and the project biologist.

III. Prior to commencement of any vegetation removal (including clearing and grubbing), a qualified biologist shall survey the project disturbance area to identify the presence of any special-status species.

IV. If any individual special-status species is found at any time prior to or during construction, work shall cease immediately in the vicinity of the individual and likely to be injured or killed by work activities, it shall either be allowed to move out of harm's way on its own or a qualified biologist, with the authorization of the USFWS and CDFW, shall move it to the nearest suitable habitat outside of the project impact area. The biologist shall be allowed enough time to move any special-status species from the site before work activities begin.

V. If a western pond turtle egg clutch is discovered during pre-construction surveys, or at any time during construction, work in the vicinity of the egg clutch shall be halted immediately. Unless otherwise advised by CDFW, the nest location shall be surrounded with high visibility fencing under the guidance of a qualified biologist and shall be avoided until the biologist determines that the clutch has hatched and individuals are no longer likely to be injured by work activities.

VI. Prior to commencement of construction, high visibility fencing and/or flagging shall be installed with the assistance of a qualified biologist to indicate the limits of work and prevent inadvertent grading or other disturbance within the adjacent sensitive habitat areas.

A. No work-related activity including equipment staging, vehicular access, grading and/or vegetation removal shall be allowed outside the designated limits of work.

B. Native trees to be retained near or within the project impact area shall be identified, protected with high visibility fencing at or outside of the dripline, and avoided during construction as sensitive habitat unless additional protection measures, provided by a qualified arborist, have been reviewed and approval by Environmental Planning Staff.

C. The fencing shall be inspected and maintained daily until project completion.

VII. A qualified USFWS-approved biologist shall be on site to monitor all initial clearing and grubbing and ground-disturbing activities associated with the project.

A. A single person on the jobsite (either the qualified biologist or a designated daily monitor) shall be responsible for daily monitoring activities which shall include:

1. Checking under all equipment for wildlife before use.
2. Inspecting all trenches, pipes, culverts or similar structures for animals prior to burying, capping, moving, or filling.
3. Ensuring that at the end of each workday, all excavations shall be secured with a cover, or a ramp installed to prevent wildlife entrapment.

VIII. Prior to commencement of construction every individual working on the Project must attend biological awareness training by a qualified biologist prior to working on the job site (also see Condition X B below). The training shall include at minimum information regarding the following:

A. Location and identification of sensitive habitats and all special-status species with potential to occur in the project area including information specific to identifying these species.

B. The importance of avoiding impacts to special-status species and their habitat, penalties for damaging habitat, and the steps necessary if any special-status species is encountered at any time.

C. Best management practices to be implemented, identification of the limits of work, and project-specific avoidance measures and permit conditions that must be followed.

IX. The property owner is responsible for obtaining and complying with all necessary approvals and permits from the appropriate regulatory agencies which may include: the United States Army Corps of Engineers (USACE), the Regional Water Quality Control Board (RWQCB), National Marine Fisheries Service (NMFS), California Department of Fish and Wildlife (CDFW), and the United States Fish and Wildlife Service (USFWS).

X. To avoid and minimize impacts to protected wildlife species the following Recommended Measures outlined in the attached Biotic Assessment Report dated May 2023 (Updated February 2024), prepared by EcoSystems West Consulting Group shall be adhered to unless otherwise directed through Consultation with CDFW and/or USFWS:

A. Prior to initiation of construction activities, a USFWS- and CDFW-approved biologist shall identify areas to be protected with exclusion fencing, and all areas requiring monitoring by a USFWS- and CDFW-approved biologist.

B. Prior to initiation of construction activities, a USFWS-approved biologist shall conduct an environmental training for all construction personnel. The training shall include a description of CRLF and its habitat, and measures to protect CRLF, and other sensitive wildlife species known or with potential to occur (WPT, nesting avian species, SF dusky-footed wood rat, and roosting bats) in the Study Area.

C. Prior to initiation of construction activities, the construction contractor shall install exclusion fencing (solid silt fencing) in specified areas along the work area boundaries, 6 inches below grade and 3.0 feet above grade, with wooden stakes at intervals of not more than 12 feet. The fence shall be maintained in working order for the duration of construction activities.

   - The USFWS-approved biologist or designated trained construction monitor shall inspect the fence daily and notify the construction foreman when fence maintenance is required.
   - The fence shall allow for wildlife passage across the work area at intervals to be determined in conjunction with USFWS and CDFW.

D. If feasible, construction activities in and adjacent to the sloughs shall take place during the dry season and before the first rain of the season, especially vegetation removal. Avoid working at night or during rain events when special-status amphibians and mammals are generally more active. Consult weather forecasts from the National Weather Service at least 72 hours prior to performing work.

E. During vegetation removal in or adjacent to the sloughs, with the authorization of the USFWS and CDFW, the agency-approved biologist will be present (or on call) to relocate CRLF (and WPT) as needed. The approved biologist shall have the authority to stop work that may result in the "take" of a special-status species. The biologist will thoroughly check all vegetation for CRLF, WPT, and other wildlife species prior to vegetation removal activities.

F. The approved biologist or construction monitor will check under all equipment for wildlife before use. If any special-status wildlife is observed under equipment or within the work area, the approved biologist will be permitted to handle and relocate it.

G. At the end of each work day, excavations shall be secured with a cover, or a ramp installed to prevent wildlife entrapment.

H. All trenches, pipes, culverts or similar structures shall be inspected for animals prior to burying, capping, moving, or filling.

I. To minimize take of CRLF during maintenance activities, restrict mowing and pruning to the dry season, after April 15 if feasible, or wait at least 2 weeks after March or April rains.

J. To minimize vehicle strikes of CRLF, if feasible, restrict parking to daytime hours.

K. The avian breeding season occurs between February 1 and September 1. If feasible, perform vegetation removal activities outside of breeding bird season to avoid direct harm or mortality to potential nesting bird species and other sensitive biological resources.

L. For all project activities initiated during the breeding bird season, or if construction activities lapse for a period of one weeks or more during breeding bird season, a qualified biologist will conduct a breeding bird survey for nesting birds, including raptors. The survey will include potential habitat for raptors and sensitive and common nesting avian species known to occur within the Study Area.

- Surveys will be conducted within 7 days, prior to beginning construction activities and will include all work, staging, access areas, and minimum survey radii surrounding the work area as follows:
    - 250 feet for non-raptors;
    - 500 feet for small raptors such as accipiters; and
    - 1,000 feet for larger raptors such as buteos.
- If no nesting sensitive or common avian species are observed during breeding bird surveys no additional measures would be required.
- If common nesting birds are observed within or adjacent to vegetation proposed for removal, postpone vegetation removal activities until young have fledged to avoid direct harm or mortality of nesting birds and/or establish buffers depending on the activity and appropriate to the species.
- Sensitive bird species, if nesting in or near the Project Area, will be given special consideration and may require additional protective measures as determined through consultation with the relevant agency (USFWS or CDFW):
    - Bald eagle, golden eagle: 1,300 feet;
    - Northern harrier, white-tailed kite, and other raptors: 300 feet;
    - Lawrence's goldfinch, grasshopper sparrow, yellow warbler: 75 feet; and
    - Oak titmouse, olive-sided flycatcher: 50 feet.

  A qualified biologist will monitor active nest sites for construction-related disturbances and adjust protective buffers as necessary to prevent further disruption of nesting activities.

M. The following measures will be implemented as Best Management Practices to protect wintering sensitive bird species, if present:

- If any work is performed during the burrowing owl and tricolored blackbird wintering period (November - March), conduct a survey for these species.

- The survey will be conducted by a qualified biologist and include the project area and suitable habitat within 150 meters (490 feet).
- If burrowing owls are detected:
    - Place visible markers near occupied burrows and fence off suitable habitat;
    - Avoid direct destruction of burrows, and
    - Include the burrowing owl in the environmental training for construction personnel
    - To avoid potential burrowing owl habitat, to the greatest extent feasible, avoid destruction of
- CDFW may require additional protective measures for wintering tricolored blackbirds, if observed.

N. Prior to construction, a qualified biologist shall conduct a preconstruction survey for woodrat houses, and clearly flag all houses within the construction impact area and immediate surroundings.

- The construction contractor shall avoid woodrat houses to the extent feasible by installing a minimum 10-foot (preferably 25-foot) buffer with silt fencing or other material that shall prohibit encroachment.
- If this buffer and avoidance is not feasible, the qualified biologist shall allow encroachment into the buffer, but preserve microhabitat conditions such as shade, cover and adjacent food sources.
- If avoidance of woodrat houses is not possible, in coordination with CDFW, a qualified biologist shall develop and implement a San Francisco Dusky-footed Wood rat Relocation Plan.

O. If feasible conduct limbing/tree removal operations between September 15 and November 1 to avoid bat maternity roosts and winter hibernacula, as well as other sensitive biological resources.

P. To avoid impacts to individual roosts, winter hibernacula, and maternity roosts, during all months, prior to limbing/tree removal, or rehabilitation of the steel barn a qualified biologist shall conduct a pre-construction survey for bats to determine if crevice or foliage roosting bats are present, as follows:

- A qualified biologist shall determine if bats are utilizing the site for roosting. For any buildings or trees/snags that could provide roosting space for cavity or foliage-roosting bats, potential bat roost features shall be thoroughly evaluated to determine if bats are present. Visual inspection and/or acoustic surveys shall be utilized as initial techniques.

- If roosting bats are found, the biologist shall develop and implement acceptable passive exclusion methods in coordination with or based on CDFW recommendations. If feasible, exclusion shall take place during the appropriate windows (September land November 1) to avoid harming bat maternity roosts and/or winter hibernacula. (Authorization from CDFW is required to evict winter hibernacula for bats).
- If established maternity colonies are found, in coordination with CDFW, a buffer shall be established around the colony to protect pre-volant young from construction disturbances until the young can fly; or implement other measures acceptable to CDFW.
- If a building or tree is determined not to be an active roost site for roosting bats, proceed with work immediately. For trees to be limbed or removed, proceed as follows:
    - If foliage roosting bats are determined to be present (e.g. hoary bat or western red bat), limbs shall be lowered, inspected for bats by a bat biologist, and chipped immediately or moved to a dump site. Alternately, limbs may be lowered and left on the ground until the following day, when they can be chipped or moved to a dump site. No logs or tree sections shall be dropped on downed limbs or limb piles that have not been in place since the previous day.
    - If the tree is not limbed or removed within four days of the survey, the survey efforts shall be repeated.

XI. To comply with Santa Cruz County General Plan Policy 5.1.12, SCCC Section 16.32.090 (C)(1)(a), and to compensate for impacts to Coastal Scrub, Coast Live Oak Woodland, Mixed Willow Riparian, Seasonal Wetlands, Freshwater Marsh, and Aquatic Habitat (Hanson Slough) and inadvertent impacts that will result from future use of the project site, the following shall be adhered to:

A. All areas temporarily disturbed as a result of the project shall be restored to pre-project contours to the maximum extent possible and re-vegetated with native plant species appropriate to the habitat disturbed.

B. All sensitive habitats permanently impacted as a result of the project shall be compensated for at a minimum 2:1 ratio through restoration or establishment of in-kind habitat at designated restoration areas on site.

C. A Habitat Restoration Plan prepared by a qualified biologist or restoration specialist shall be submitted to, and approved by, the County Environmental Coordinator prior to the final CEQA determination.

The Habitat Restoration Plan shall be focused on restoring/establishing native plant structure and species composition of native habitat that was disturbed as a result of this project and must include the following minimum elements:

- A map of all designated restoration areas on site identifying:
    - Locations where temporary disturbance and re-establishment of native habitat shall occur pursuant to Condition XI.A.
    - Locations designated for restoration or establishment of native habitat intended to compensate for permanently impacted sensitive habitats at 2:1 ratio as required in Condition XI.B.
- A planting plan with species, size, and locations of all restoration plantings needed to establish native plant structure and species composition of the habitats being restored. These plantings shall occur at sizes and ratios determined by the restoration specialist to adequately establish native habitat while maximizing plant health and survivability of individual plants.
- Plan for removal of non-native species on the parcel and a management strategy to control re-establishment of invasive non-native species in restored areas.
- Information regarding the methods for restoration and invasive plant removal including protective measures for special-status species.
- Information regarding the methods of irrigation for restoration plantings.
- A plan for implementation of the Habitat Restoration Plan including establishment and planting of all restoration areas that coincides with the phased approach of project implementation. All completed restoration areas shall be inspected and approved by Environmental Planning staff.
- Any seed mix used for erosion control purposes on temporarily impacted areas and exposed soils shall be limited to seeds of native species common to the surrounding habitat and/or sterile seeds.
- A 5-year Management Plan for maintenance and monitoring of restored areas, including a proposed mechanism for evaluating success. Annual reports outlining the progress and success of the restoration and monitoring shall be submitted to the County Restoration Coordinator (restoration.coordinator@santacruzcountyca.gov) by December 31 of each monitoring year.

Biotic Assessment for the proposed

Community Harvest Program

at

Watsonville Slough Farm
Santa Cruz County, CA

Prepared for

The Land Trust of Santa Cruz County
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Santa Cruz, CA 95060
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180 7th Avenue, Suite 201
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Table of Contents

List of Figures

List of Tables

1.0 INTRODUCTION

This report presents the findings of an aquatic resources, botanical, and wildlife assessment conducted for the Land Trust of Santa Cruz County (Land Trust) by EcoSystems West Consulting Group (EcoSystems West) of the Watsonville Slough Farm (WSF) for infrastructure associated with the proposed Community Harvest Program (Program).

The Land Trust is proposing to develop the Program on the WSF property (APNs 052-081-34, 052-081-35, and 052-081-37) at 275 Lee Road in unincorporated Santa Cruz County, adjacent to the city limits of Watsonville (**Figure 1**). The proposed Program would occur on the 490-acre working farm, actively cultivated in industrial scale organic row cropping. The proposed Program would allow managed visitor access to the WSF property, under the supervision of onsite caretakers. The Program makes use of existing roads and trails providing access to various WSF Program elements. The Program includes the construction of two (2) boardwalk crossings with integrated fish screens and three (3) viewing platforms. Six new trail segments, totaling 0.42 miles long, are proposed to connect these constructed elements to existing roads and trails. One existing trail, 0.23 miles long, will be rebuilt to meet accessibility guidelines.

The objectives of the aquatic resources, botanical and wildlife assessment were to:

- Review relevant studies, documents, and databases, and consult with associates and agency representatives;
- Characterize, map, and evaluate the vegetation and habitat types in the Study Area including the 3.13 acres of proposed new development associated with the Program;
- Identify the wildlife resources (habitats, species, and wildlife movement) in the vicinity of the larger 193.4-acre Biological Study Area (Study Area);
- Identify sensitive plant and wildlife species occurring, or potentially occurring, in the Study Area;
- Assess potential Program-related impacts to sensitive habitat types including Environmentally Sensitive Habitat Types (ESHA) as defined by the California Coastal Act (1976) and County of Santa Cruz Local Coastal Program (LCP) (1994);
- Assess Program-related potential impacts to sensitive plant and wildlife species and wildlife movement;
- Develop best management practices and minimization measures to avoid and minimize potential impacts to sensitive biological resources, to incorporate during Program design, construction, and implementation;
- Identify mitigation measures for potential impacts to sensitive resources, where required; and
- Outline the basic requirements for a conceptual mitigation plan to offset potential impacts, to be utilized during agency consultation and permitting.

Figure 1.

Land Trust of Santa Cruz County Watsonville Slough Farms Community Harvest Project Area, Watsonville, CA

ECOSYSTEMS WEST CONSULTING GROUP

2.0 PROGRAM DESCRIPTION

The proposed Program includes opening the WSF property for managed visitor access, under the supervision of onsite caretakers for:

- fruit and vegetable harvest from designated harvest areas (Conceptual Community Harvest Areas),
- education on sustainable agricultural practices and the conservation of agricultural land, and
- education on the conservation and stewardship of the surrounding natural open space and slough system.

Visitor access would be managed based on the timing of agricultural production and harvest, protection and management of sensitive biological resources, program management and logistics, and safety.

The Program activities and facilities will be centered in two parts of the ranch (**Figure 2**). The primary improvements will be located at the proposed Community Harvest Gateway, which would be accessed off Lee Road. The secondary location will be at the Little Bee Barn, which would be accessed off Harkins Slough Road and may be accessed from the Santa Cruz County Coastal Rail Trail in the future. With the exception of transportation to the property, and limited exceptions for people with accessibility challenges, all access on the property would be on foot.

2.1 COMMUNITY HARVEST GATEWAY

The Community Harvest Gateway (Gateway) is proposed to be an approximately 4-acre area accessed from 275 Lee Road that includes the following components:

- Redesigned entrance from Lee Road with fence, gate, and signage;
- Parking area (53 spaces), bus drop-off area, electrical vehicle charging station, sidewalks and pervious concrete walking surfaces, lighting, and stormwater management structures;
- Group picnic area with shade structures (2);
- Restroom
- Replacement of the existing 80-foot by 60-foot steel barn which may accommodate the following facilities[1]:
  - Produce washing and preparation (sinks and tables)
  - Drinking water facilities
  - Equipment storage
  - Farm stand
  - Office space
- Accessible trail and new natural surface footpath above Chivos Pond
- Landscaping with agricultural and native plants

The Gateway would take advantage of existing and previously developed areas, including a former residence, existing well, and septic system (to be expanded or rebuilt). As noted above, the Gateway includes the replacement of the large existing barn located near the Lee Road entrance. Driveway transitions, fencing, gates, and signage will be improved and updated to improve vehicle circulation, secure the property when it is not open, and direct visitors to stay within designated Conceptual Community Harvest Areas.

[1] These facilities may also be constructed as separate free-standing structures in the same general area.

Figure 2a.

Watsonville Slough Farm Community Harvest Project

Conceptual Trail
Existing Trail
Conceptual Boardwalk Crossing
Observation Platform
Community Havest Areas
Contours (20Ft)
Property Boundary

Map created by LTSCC
Software donated
by ESRI

N

0 250 500 1,000 1,500 Feet

LAND TRUST OF SANTA CRUZ COUNTY

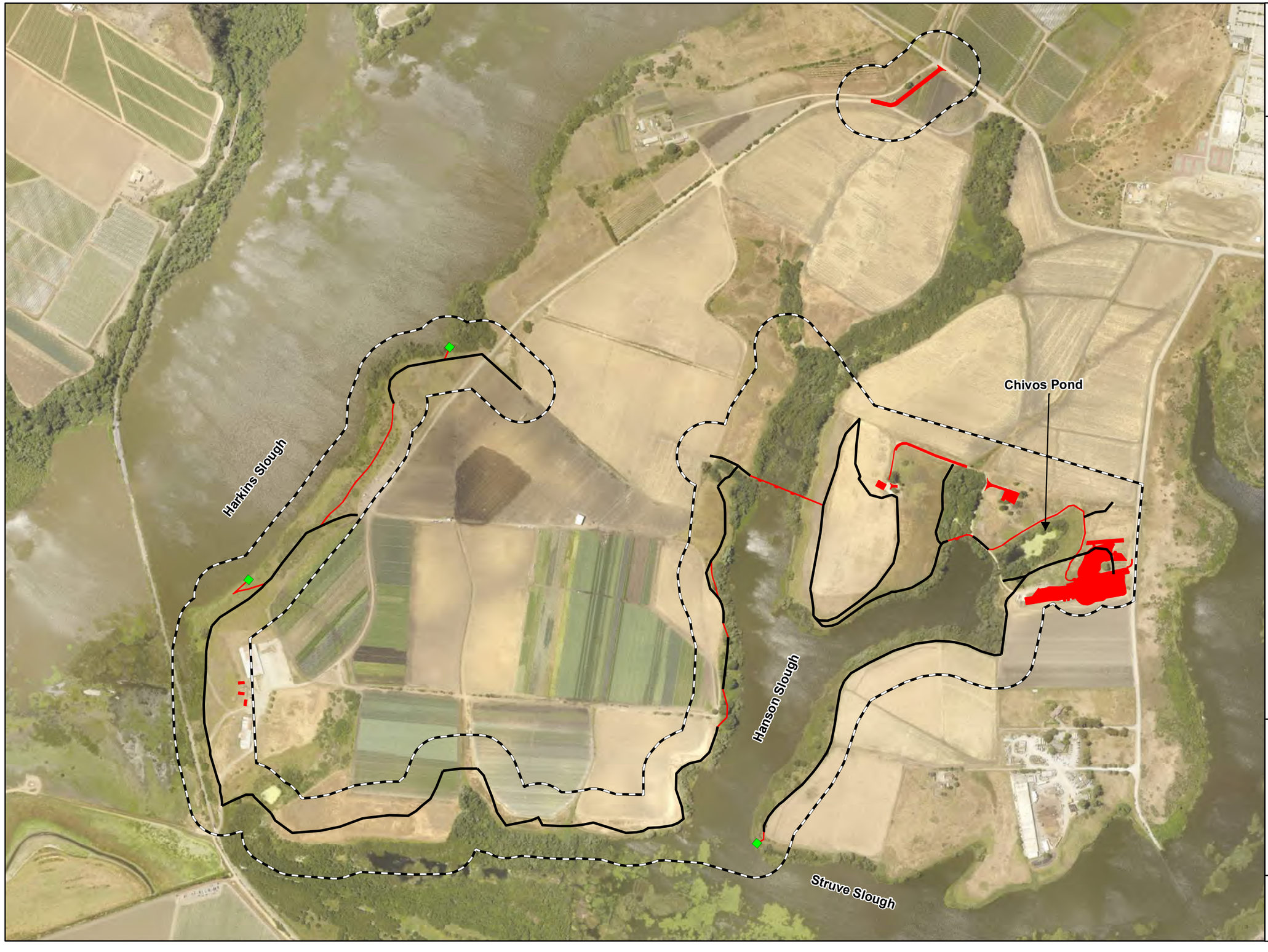

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Figure 2b.

Watsonville Slough Farm
Community Harvest Program

Proposed Improvements
and
Biological Study Area

- Biological Study Area
- Existing Trails and Roads
- Program Improvements
- Viewing Platforms

N W E S

1 inch=550 feet

0 250 500 1,000 Feet

Drawn By: J. Davilla, ESW
Date: 3/13/2023
Filepath: E:\Watsonville Slough Farms
Image: ESRI Basemap

Accessible Trail

The proposed accessible trail around Chivos Pond would be a 5-foot wide pervious-surface trail approximately 0.23 miles in length, including approximately 0.19 miles of trail that would be graded. Some grading would occur on top of an existing natural surface trail while other portions would be located in a disturbed area dominated by the invasive plant, poison hemlock. The trail would connect to an existing farm road that skirts the east branch of Hanson Slough. This road currently crosses over the culvert that separates Chivos Pond from the main body of the east branch of Hanson Slough.

2.2 LITTLE BEE BARN

The existing Little Bee Barn is located at the end of a 1-mile-long driveway off Harkins Slough Road and close to the alignment of the Rail Trail. The Little Bee Barn would provide a site for seasonal Community Harvest gatherings. Vehicle access to the Little Bee Barn would be permitted and managed on this occasional basis. Existing ranch roads and proposed new footpaths would allow for managed pedestrian access to the Little Bee Barn area and to Conceptual Community Harvest Areas from the Gateway. The Rail Trail may provide future access to the Little Bee Barn.

The Harkins Slough Road access would be realigned to avoid a steep hill which becomes inaccessible during the rainy season. This will reduce erosion and increase safety on the road. The new entrance road will connect to the County right-of-way and will require an encroachment permit. Modest improvements will be made to fencing and signage for security purposes.

Little Bee Barn improvements include the following project elements:

- Farmworker housing sites (2)
- Redesigned entrance from Harkins Slough Road with fence, gate, and signage
- New natural surface footpaths
- Observation platforms (2)

2.3 CONCEPTUAL COMMUNITY HARVEST AREAS

Conceptual Community Harvest Areas would be situated strategically in unleased areas of WSF to limit the impact on the adjacent commercial agricultural growing areas. These areas include the former residential area along Lee Road, along ranch roads, on retired farm fields, and/or on less productive fields. In addition, commercial growers operating on leased land within Watsonville Slough Farm may elect to incorporate Conceptual Community Harvest Areas into their agricultural production strategy. Conceptual Community Harvest Areas would be planted in orchard trees, berries, nopales, flowers, perennial herbs, and row crops.

Conceptual Community Harvest Areas will also provide signage and opportunities for visitors to learn about farming in harmony with nature, including the demonstration of sustainable farming practices, and the farming of culturally significant Native American crops and plants.

Conceptual Community Harvest Areas are likely to be dynamic in location, accounting for changing soil, microclimate, operational considerations, and crop choice. Examples of Conceptual Community Harvest

Areas are shown in **Appendix A**, as summarized in the Community Harvest Program Statement (LTSCC 2022).

2.4 CARETAKER/FARMWORKER HOUSING SITES

A total of four farmworker housing sites are proposed in two currently-developed areas above Chivos Field and immediately south of the Little Bee Barn. The occupants, one of which may be a caretaker, will assist in the management of facilities and visitor access. Improvements at these sites include new pads and upgraded utilities.

2.5 ADDITIONAL IMPROVEMENTS

From the Gateway, visitors would also have access to Conceptual Community Harvest Areas, as well as to agricultural and nature study opportunities, mainly along existing farm roads and trails, with some new trails proposed, as well as boardwalks with integrated fish screens, viewing platforms, and interpretive signage (**Appendix A**). Proposed improvements would include:

- Cypress Hilltop Ranch Overlook with
  - Picnic area
  - Restroom
  - Shade structure
  - Limited access road improvements
- Boardwalk/Fish Screen A
- Boardwalk/Fish Screen B
- Interpretive signage
- Six (6) natural surface trail segments totaling approximately 2,200 linear feet

Cypress Hilltop Ranch Overlook (Picnic Area)

Cypress Hilltop Ranch Overlook (Cypress Hilltop Picnic Area) would be centered on an existing developed area (the site of a former residence), where proposed restrooms would be constructed. Proposed improvements also include a baserock turnaround that would be situated in a heavily disturbed area immediately to the east that is currently dominated by invasive weeds (poison hemlock and Harding grass) and a picnic area that would be located in non-native grassland immediately to the west.

A Conceptual Community Harvest Area (Cypress Hilltop Field) is proposed immediately southeast of the amenities.

Cypress Hilltop Picnic Area would also provide visitors with a close-up view of the Land Trust's WSF native grassland (coastal prairie) restoration activities, designed and implemented in partnership with Watsonville Wetlands Watch. Recently fallow agricultural fields (last planted in 2018) to the west of Cypress Hilltop are the site for current early-stage grassland restoration. These fields were retired because of steep slopes and high rates of erosion.

Boardwalk/Fish Screen A

Boardwalk/Fish Screen A is proposed to be constructed over an existing deteriorated paved road across the east branch of Hanson Slough. The road is currently submerged during winter months. Boardwalk/Fish

Screen A would allow pedestrians to visit Cypress Hilltop Picnic Area, Cypress Hilltop Field, and view grassland restoration described above.

Boardwalk/Fish Screen A would be approximately 145 feet long, including abutments, and 6 feet wide with an additional viewing platform bump out (approximately 20 feet by 7 feet) proposed to be positioned at an opening in the riparian canopy along the boardwalk. Boardwalk/Fish Screen A would be constructed of plastic or composite wood decking with concrete abutments.

Boardwalk/Fish Screen B

Boardwalk/Fish Screen B is proposed to be constructed over the west branch of Hanson Slough and would connect an existing farm road and mowed trail through non-native grassland to an existing natural surface (unpaved) road and trail on the west side of this branch of Hanson Slough. This road and trail would allow visitors to reach additional Conceptual Community Harvest Areas, the Heart Barn Barn, and an Observation Viewing Platform 1.

Boardwalk/Fish Screen B would be approximately 330 feet long, including abutments, and 6 feet wide, with three additional viewing platform bump outs (approximately 20 feet by 7 feet each). Boardwalk/Fish Screen B would be constructed of plastic or composite wood decking with concrete abutments.

Natural Surface Trails

Natural surface trails 5 feet in width are proposed in select locations to provide connections between existing farm roads and trails to allow visitors to reach Conceptual Community Harvest Areas and observation platforms. Natural surface trails are proposed as shown in **Table 1** below.

Table 1. Proposed Natural Surface Trails for the Community Harvest Program at Watsonville Slough Farm, Santa Cruz County, CA.

Segment ID	Location	Length (feet)	Access	Purpose/s (Destination/s)	Habitat Types
1	East Side of Hanson Slough/ Struve Slough Confluence	89.7	Existing Farm Road	CHA (Hanson Slough Block 1) Nature Study (Observation Platform 1)	Poison Hemlock (Ruderal) Mixed Willow Forest
2	Cypress Hilltop Field/East Side of West Branch Hanson Slough	224.3	Existing Trails	CHA (Hanson Slough Block 12 and Heart Barn Field) Little Bee Barn	Non-native Grassland Seasonal Wetland
3	West Side of West Branch Hanson Slough	561.2	Existing Trails	CHA(Hanson Slough Block 12 and Heart Barn Field) Little Bee Barn	Mixed Willow Forest Coast Live Oak Forest
4	East Side of Harkins Slough (south trail) near Little Bee Barn	321.1	Existing Trail	Nature Study (Observation Platform 2)	Ruderal – Poison Hemlock
5	East Side of Harkins Slough (middle trail)	870.1	Existing Trail	CHA (Harkins Slough Block 9)	Ruderal – Poison Hemlock Coyote Brush Scrub
6	East Side of Harkins Slough (north trail) near CHA Harkins Slough Block 9	79.8	Existing Trail	Nature Study (Observation Platform 3)	Mixed Willow Forest

The 490-acre farm property has been variously disturbed as a part of its agricultural use for at least a century, well before the Land Trust's acquisition of the property in 2009. As a working farm, the property and its infrastructure are dynamic, with support facilities (fencing, gates, drainage improvements, irrigation, water pump infrastructure, agricultural grading, agricultural equipment storage, materials

storage, and the road and trail network) being maintained, introduced, moved or retired on a regular basis as growers and the Land Trust are responsive to agricultural operations.

As a result of the ongoing shifts in agricultural operations and facilities, trails and roads temporarily lapse in use and maintenance, and are subsequently re-established and maintained. The Community Harvest Program proposes to use currently maintained and recently re-established roads and trails, as well as some roads and trails that have been out of use for several years or are located in or adjacent to currently fallow agricultural fields.

2.6 ENHANCEMENT OF CALIFORNIA RED-LEGGED FROG AQUATIC BREEDING HABITAT

As proposed in the Watsonville Slough Farm Management Plan (2012) and as a Best Management Practice recommended by US Fish and Wildlife Service (USFWS), the Land Trust proposes to install fish exclusion screening under the boardwalks which would isolate waters upstream of the boardwalks from predatory fish species (such as carp, bullhead, goldfish, largemouth bass and mosquitofish). These fish species are predators of California red-legged frog (CRLF) (*Rana draytonii*) at all life stages (egg masses, tadpoles, metamorphs, juveniles, and adults). As a result of screen installation, by excluding non-native predatory fish species, the waters upstream of the fencing would be enhanced for CRLF breeding, development of egg masses and tadpole rearing.

The fish screens would consist of a curtain of fabric suspended from the edge of the deck of the boardwalks. The fabric would span the full width of the slough and extend down to and lay on the bed of the slough. The decks of the boardwalks will be approximately five feet above the slough bed at their highest point. The water levels would fluctuate seasonally from dry to within 1 foot of the deck of the boardwalk. The fabric would be a UV-stable polypropylene nonwoven geotextile material. The curtain would be approximately 8 feet high and run the full length of the boardwalk. To rest firmly on the bottom, the curtain would be weighted with an iron chain sewn into a sleeve along the lower edge of the fabric. To facilitate inspection and maintenance, the curtains will be constructed of overlapping segments and attached to the boardwalk with grommets and clips. These are backwater portions of the slough with negligible current velocity.

3.0 DESCRIPTION OF THE STUDY AREA

The Watsonville Slough Farm (WSF) is a 490-acre property owned by the Land Trust of Santa Cruz County In 2009, the property was protected from development in perpetuity with funding for acquisition from the State Coastal Conservancy and Wildlife Conservation Board. The farm hosts 240 acres of highly productive certified organic vegetable and strawberry fields, and 250 acres of wetland, woodland, and grassland habitats. Currently public access is not allowed.

The WSF is situated on the terraces and slopes adjacent to, and above, the greater Watsonville Sloughs system. The farm encompasses the East Branch and West Branch of Hanson Slough (including Chivos Pond, a disconnected feature at the northeastern finger of the East Branch), to its confluence with Struve Slough, and abuts Struve Slough to the southeast and south, Watsonville Slough to the south, and Harkins Slough to the west. The sloughs transition from open water to freshwater emergent marsh in shallower areas. In some locations, the sloughs are bordered by relatively intact riparian forest, coastal scrub, and oak woodland sensitive natural plant communities/habitat types. In other locations, the sloughs are bordered by monospecific stands (one species) of highly-invasive weeds (i.e., poison hemlock). This variability reflects the historical and present day mixed agricultural uses of the farm. The topography of the farm slopes up from the surface water elevation of the sloughs at approximately 7-8 feet above Mean Seal Level (AMSL)(NAVD88) to the agricultural fields and hilltops at approximately 92 feet above sea level.

The Biological Study Area (Study Area) was determined to be the portions of WSF proposed for Program development, as described in Section 2 above, as well as existing roads and trails, and the agricultural fields proposed as Conceptual Community Harvest Areas that connect to the proposed Program elements. The Study Area includes a minimum buffer of 150-feet extending around these areas (**Figure 2b**).

The Study Area extends beyond those areas proposed for Program improvements in order to adequately characterize surrounding aquatic and biological resources and potential impacts to these resources, and to capture contiguous vegetation communities and habitat types, important wildlife habitat, including wildlife dispersal and movement areas, and nearby sources of native and invasive plant propagules.

The Study Area is comprised of the existing developed areas where the Program would be centered (Gateway, Little Bee Barn, Caretaker/Farmworker Housing Sites, and Cypress Hilltop Picnic Area), and the areas proposed for the boardwalks, observation points, and new natural surface trail segments. These last features are proposed to be situated in ruderal habitat wherever feasible with minimal encroachment into seasonal wetland, scrub shrub wetland, freshwater emergent marsh, mixed willow forest, coast live oak woodland and coastal scrub.

The Study Area also incorporates the existing roads and trails and the agricultural fields proposed as Conceptual Community Harvest Areas which are directly connected to Program improvements.

4.0 METHODS

4.1 REVIEW OF LITERATURE AND DATA SOURCES

EcoSystems West botanists reviewed literature and special-status species databases to identify sensitive habitats, plants, and wildlife species with potential to occur in the Study Area. Sources consulted include:

- CNDDB occurrence records (2023a) and resource maps from the Biogeographic Information and Observation System (BIOS) (CNDDB 2023b) for the Watsonville West USGS 7.5-minute quadrangle and (for plants) seven surrounding quadrangles;
- USGS quadrangle occurrence records in the California Native Plant Society's (CNPS) *Online Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2023) for the Watsonville West quadrangle and the seven surrounding quadrangles;
- Local and regional floras (Thomas 1961; Munz and Keck 1973; Hickman 1993; Baldwin *et al*. 2012);
- Local regional experts on sensitive wildlife species; and
- Other literature and databases that contained sensitive wildlife species lists for the vicinity, such as ebird (2023).

Sources consulted for current conservation status information include U.S. Fish and Wildlife Service (USFWS) (2023a,b,c) for species listed under the federal Endangered Species Act (ESA) (including federal Proposed and Candidate species), and California Department of Fish and Wildlife (CDFW) (2023a,b,c) for species listed under the California Endangered Species Act (CESA) as 'Threatened' or 'Endangered' or listed as 'Species of Special Concern'. We also included those species state ranked by NatureServe as critically imperiled, imperiled, and vulnerable (Faber-Langendoen 2012, CDFW CNDDB 2023).

For special-status plants, we reviewed the CNPS *Inventory* (Tibor 2001; CNPS 2023): List 1A (Plants Presumed Extinct in California), List 1B (Plants Rare, Threatened, or Endangered in California and Elsewhere), or List 2 (Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere). We also reviewed List 3 (Plants About Which We Need More Information -- A Review List) and List 4 (Plants of Limited Distribution -- A Watch List) of the CNPS *Inventory*[2] (Tibor 2001; CNPS 2023).

For wildlife species, we reviewed the USFWS list of *Birds of Conservation Concern* (BCC) (USFWS 2021) and the list of bat species considered 'High Priority' by the Western Bat Working Group (WBWG) (2017).

Based on information from the above sources, we developed target lists of special-status plants (**Appendix B**) and wildlife species (**Appendix C**) with potential to occur in the vicinity of the Study Area. Our desktop assessment followed CDFW (CNDDB 2023a,b) and other standard survey protocols. We reviewed distribution information for sensitive species to determine which species would have the potential to occur in or near the Study Area and which species could be eliminated from consideration, based on soils, vegetation and habitat types, locations of known occurrences, dispersal distances (for wildlife), and professional knowledge of the region and local sensitive species.

[2] List 3 and List 4 plant species are considered to be of lower sensitivity, and generally do not fall under specific state or federal regulatory authority. Specific mitigation considerations are generally not required for species in these last categories (Tibor 2001; CNPS 2023).

4.2 FIELD VISITS

Botany

An EcoSystems West plant ecologist conducted a wetland assessment and focused rare plant surveys of the WSF Community Harvest Program Study Area based on site visits in July 2020 and May 2021. The entire Study Area was thoroughly evaluated during field surveys. All vascular plant species in identifiable condition on the survey dates were identified to species or infraspecific taxon, regardless of their regulatory status. The identifications were facilitated by the use of keys and descriptions in Thomas (1961); Munz and Keck (1973); Hickman (1993); and Baldwin et al. (2012). The timing of the floristic surveys was adequate for identification of the special-status species listed in **Appendix B**. Specifically, Santa Cruz tarplant (*Holocarpha macradenia*; FE, CNPS List 1B.2) is known from seven (7) occurrences in the Watsonville Sloughs watershed, although none are identified within the Program Area. One extant occurrence is located immediately west of the Study Area in disturbed grassland on the High Ground Organics property at 521 Harkins Slough Road. However, despite numerous rare plant surveys both within the Study Area, and on adjacent properties including the CDFW Reserve east of Lee Road, novel occurrences of Santa Cruz tarplant have not been observed in the vicinity of the Program area since the early 1990s.

The EcoSystems West plant ecologist characterized and mapped all habitat types, including wetlands, occurring within the Study Area. We also recorded data on physiognomy, dominant and characteristic species, topographic position, slope, aspect, substrate conditions, hydrologic regime, and evident disturbance for each habitat type. In classifying the habitat types on the site, we consulted the generalized plant community classification schemes of Holland (1986); Sawyer et al. (2009); and CDFW (2023d). Our final classification and characterization of the habitat types of the Study Area was based on field observations.

Wildlife

EcoSystems West wildlife biologists conducted site visits in March, May, and June 2021. Our objective during these visits was to assess and identify potential habitat for the sensitive wildlife species listed in **Appendix C** following standard survey techniques for each species.

Amphibians and Reptile Assessment. EcoSystems West Consulting Group conducted assessments of potential upland, dispersal, movement, and aquatic habitats (if present) for those species listed in **Appendix C**.

Surveys followed the methods outlined in agency protocols to conduct habitat site assessments for federally-listed amphibians: Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*) (USFWS and CDFW 2012), California tiger salamander (*Ambystoma californiense*) (USFWS and CDFW 2003), and California red-legged frog (*Rana draytonii*) (USFWS 2005). Biologists evaluated potential habitats within the Study Area and reviewed occurrence records within agency-designated radii for each species. With this information, biologists determined the likelihood of amphibians to utilize or move through the property from nearby known locations. Formal protocol-level surveys were not conducted as part of this effort.

EcoSystems West biologists also evaluated the site for the Santa Cruz black salamander (*Aneides niger*) and for the southwestern pond turtle (*Actinemys pallida*)[3].

Raptors/Bird Assessment. Sensitive avian species that may occur in the vicinity of the Study Area are included in **Appendix C**. EcoSystems West biologists evaluated the Study Area and reviewed distribution and occurrence data to determine which raptors and non-raptor avian species could potentially nest on the site and which species could be eliminated from consideration. For certain bird species (such as those listed as "Fully Protected") we also considered wintering and foraging activities.

We conducted avian surveys during June 2019 and May 2020 to determine which special-status and common bird species were utilizing the Study Area. We selected observation points and documented observations, including foraging, courtship displays, and breeding behavior by birds/raptors in the Study Area. A comprehensive breeding bird survey was not performed because nest sites for most avian species are dynamic and nest locations vary from year to year.

Mammal Assessment. EcoSystems West biologists evaluated the Study Area for special-status bat roost features. We visually inspected the tree stands for potential roost features or evidence of bats (e.g., tree cavities, senescent limbs, peeling bark, or guano deposition) (Brown et al. 1996). We also conducted an acoustic and emergence bat survey of the steel barn proposed for renovation. EcoSystems West documented potential and occupied habitat for the San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), including stick nest structures on the ground or in trees, scrub, and the understory of woodland habitat, if present.

[3] Southwestern pond turtle (*Actinemys pallida*) is also known as western pond turtle (*Emys marmorata*). The Special Animals List (CDFW CNDDB 2023) shows this turtle as western pond turtle (*Emys marmorata*). The CDFW does not track the species by the two formerly recognized subspecies nor does it recognize the Phillip et al. (2014) description of two species of pond turtles (as Nafis 2018 does): Previously, the western pond turtle, *Actinemys marmorata,* was split into two subspecies: *A. m. marmorata* and *A. m. pallida*. The single species has been split into two full species, corresponding to the previous two subspecies - *Actinemys marmorata*, and *Actinemys pallida*. The authors "...propose using the name *Emys marmorata* for all populations north of the San Francisco Bay area plus populations from the Great Central Valley north. *Emys pallida* is restricted to those populations inhabiting the central coast range south of the San Francisco Bay area to the species' southern range boundary, including the Mojave River."

5.0 REGULATORY BACKGROUND

Federal, state, and local regulations have been enacted to provide for the protection and management of sensitive biological and water resources. Those pertinent to the Project are summarized below.

5.1 FEDERAL REGULATIONS

Federal Endangered Species Act

The provisions of the federal ESA of 1973 (Title 16 United States Code, Section 1531 *et seq*., as amended) protect federally-listed Threatened and Endangered species and their habitats from unlawful "take."[4] Activities that may result in "take" are regulated by the USFWS for terrestrial federally-listed species. Listed species are taxa for which proposed and final rules have been published in Federal Register (USFWS 2023a, 2023b). Candidate species are not afforded any legal protection under the federal ESA but typically receive special attention from federal and state agencies during the environmental review process (USFWS 2023c).

The federal ESA or its implementing regulations do not prohibit take of listed plant species. However, federal agencies cannot undertake activities that would jeopardize the continued existence of a threatened or endangered plant. In addition, the removal of threatened or endangered plants may be a violation of the federal ESA under certain circumstances, if the action is not in compliance with state law.

For projects with federal involvement (i.e., funded, authorized, or carried out by a Federal agency), permits for "take" may be obtained through coordination and interagency consultation with the USFWS pursuant to Section 7. Designated "Critical Habitat" for plants or animals, determined and published in the Federal Register as a formal rule, also receives protection under Section 7 of the ESA. For actions with no federal nexus, consultation with USFWS takes place under 10(a)(1)(B) of the federal ESA.

Migratory Bird Treaty Act

All migratory birds and their nests are federally protected under the Migratory Bird Treaty Act of 1918 (MBTA) (Title 16 United States Code, Section 703-712 as amended; 50 Code of Federal Regulations Section 21; and 50 CFR Section 13) (and by California Department of Fish and Game Code provisions that support the act). The MBTA makes it unlawful to "take" any migratory bird or raptor listed in the 50 CFR Section 10, including their nests, eggs, or products.

Birds of Conservation Concern

The USFWS *Birds of Conservation Concern* (BCC) (USFWS 2021) was developed to fulfill the mandate of the 1988 amendment to the Fish and Wildlife Conservation Act [Public Law 100-653 (102 Statute 3825)] to protect migratory nongame birds that without additional conservation action are likely to become candidates for listing under the ESA. The overall goal is to identify those bird taxa (beyond those already designated as federally threatened or endangered) that represent the highest conservation priorities of the USFWS in order to stimulate coordinated, collaborative and proactive conservation actions. Factors considered include: population size, breeding and non-breeding distribution, threats, population trends,

[4] Section 3(18) of the FESA defines "take" to mean to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Service regulations (50 Code of Federal Regulations [CFR] 17.3) define "harm" to include significant habitat modification or degradation that actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering. "Harassment" is defined by USFWS as an intentional or negligent action that creates the likelihood of injury to listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.

relative density (USFWS 2021). These species typically meet the criteria of the CEQA Guidelines and are considered during environmental review.

Bald Eagle Protection Act

The Bald Eagle Protection Act of 1940 (16 U.S.C. 668-668d, 54 Stat. 250) as amended, provides for the protection of the bald eagle and the golden eagle by prohibiting the taking, possession, and commerce of such birds, their eggs, and their nests except under certain specified conditions. In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.

Executive Order 13112 - Invasive Species

This order enlists federal agencies to prevent the introduction of invasive species, provide for their control and minimize the economic, ecological, and human health impacts that invasive species cause. In addition, federal agencies are required, when feasible, to restore native species and ecosystems and promote public awareness about invasive species.

Wetlands and Waters of the U.S.

Wetlands are defined by the USACE as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (EPA, 40 CFR 230.3, and CE 33 CFR 328.3).

The USACE uses three criteria to delineate wetlands: the presence of (1) hydrophytic vegetation, (2) wetland hydrology, and (3) hydric soils. According to the USACE Manual, evidence of at least one positive wetland indicator from each parameter must be found in order to make a positive determination.

Areas that are inundated for sufficient duration and depth to exclude growth of hydrophytic vegetation, such as lakes and ponds, or convey water, such as streams, are considered “other waters.” Along the central California coast, these other waters can include intermittent and ephemeral streams, as well as lakes and rivers. Other waters are identified by the presence of an ordinary high-water mark[5], a defined river or stream bed or bank, or by the absence of emergent vegetation in ponds or lakes.

Wetlands and other waters of the U.S., including streams, ponds and lakes, are regulated by the USACE and the Regional Water Quality Control Board (Regional Board) under Sections 401 and 404 of the Clean Water Act.

Federal Clean Water Act (Section 404). Under Section 404 of the Clean Water Act, the USACE is responsible for regulating the discharge of fill material into waters of the U.S. The term “waters” includes wetlands and other waters that meet specific criteria as defined in the CFR (EPA, 40 CFR 230.3, and CE 33 CFR 328.3). In general, a permit must be obtained before fill can be placed in wetlands or other waters of the U.S. The type of permit depends on the amount of acreage and the purpose of the proposed fill, subject to the discretion of the USACE.

[5] An ordinary high-water mark is defined as the natural line on the shore established by fluctuations of water.

Federal Clean Water Act (Section 401). Section 401 of the Clean Water Act (CWA) assigns overall responsibility for water quality protection to the State Water Resource Control Board and directs the nine statewide Regional Boards to develop and enforce water quality standards within their boundaries. A 401 Certification is required from the Regional Board whenever improvements are made within Jurisdictional Waters of the U.S.

Executive Order 11990. Executive Order 11990 (42 FR 26961, 3 CFR, 1977 Comp., p. 121) mandates that federal or federally assisted projects and programs minimize the destruction, loss, or degradation of wetlands and avoid new construction in wetlands, accounting for public health and safety, maintenance of natural systems, and other public interests.

5.2 STATE REGULATIONS

California Environmental Quality Act (CEQA)

Based on provisions of Section 15380 of the *CEQA Guidelines*, plants and animals with the following protected status may be addressed in CEQA documents on proposed development projects: federally-listed Endangered or Threatened species under the FESA, federal Proposed and Candidate species, and species listed by the state of California as Endangered, Threatened, or Rare under the California Endangered Species Act (CESA) or California Native Plant Protection Act (NPPA).

In addition, under Section 15380(d) of the *CEQA Guidelines*, a species not included on any list recognized by the state "shall nevertheless be considered rare or endangered if the species can be shown to meet the criteria" for listing. The CDFW, USFWS, and U.S. Forest Service all maintain independent lists of species with designated conservation status that meet the *CEQA Guidelines* criteria for consideration. Based on provisions of Section 15380(d) of the *CEQA Guidelines*, lead agencies, in making a determination of impact significance, typically treat non-listed plant and animal species as equivalent to listed species if the non-listed species satisfy the minimum biological criteria for listing. In assigning "impact significance" to populations of non-listed species, analysts generally consider factors such as population-level effects, proportion of the taxon's range affected by a project, regional effects, and impacts to habitat features. CDFW recommends considering these species during analysis of proposed project impacts to protect declining populations, and to avoid the need to list them as threatened or endangered in the future. The CEQA Guidelines direct lead agencies to consider impacts of the proposed project on individual animals, communities, populations, range, and habitat of species that meet the CEQA criteria.

The CEQA Guidelines also direct project proponents to assess and mitigate for impacts to sensitive natural communities identified in local or regional plans, policies, regulations or by the CDFW or USFWS, including wetlands.

In addition, the CEQA Guidelines include consideration of substantial interference with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or the use of native wildlife nursery sites.

Finally, CEQA requires that local policies or ordinances protecting biological resources, Habitat Conservation Plans, Natural Community Conservation Plans, or other approved local, regional, or state habitat conservation plan be considered during environmental review.

California Endangered Species Act

The California Endangered Species Act (CESA) protects native plant and animal species (and their habitats) "in danger of, or threatened with, extinction because their habitats are threatened with destruction, adverse modification, or severe curtailment, or because of overexploitation, disease, predation, or other factors" (California Fish and Game Code [CFGC] 1984, Section 2050-2116). The CESA prohibits the "take"[6] of state-listed endangered, threatened, and candidate species. The CDFW maintains lists of Endangered, Threatened, and Rare plants (CDFW 2023a) and Endangered and Threatened animals (CDFW 2023b), as designated by the California Fish and Game Commission and under the California Native Plant Protection Act (NPPA)(1977). The Habitat Conservation Planning Branch of CDFW administers the state's rare species program. In addition to recognizing three levels of endangerment, CDFW can afford interim protection to candidate species while the California Fish and Game Commission reviews them. Habitat degradation or modification is not expressly included in the definition of "take" under the CFGC, but CDFW has interpreted "take" to include the "killing of a member of a species which is the proximate result of habitat modification."

California Native Plant Protection Act

The California NPPA (CFGC Section 1900 - 1913) was enacted in 1977 and allows the California Fish and Game Commission to designate plants as rare or endangered. The NPPA limits the circumstances in which endangered or rare native plants may be taken. Project permitting and approval requires compliance with NPPA.

California Native Plant Society Inventory

The CNPS prepares and regularly updates an *Inventory of Rare and Endangered Vascular Plants of California*. In general, CDFW qualifies for legal protection under CEQA those plant species with a California Rare Plant Rank (CRPR) of List 1A (Plants Presumed Extinct in California), List 1B (Plants Rare, Threatened, or Endangered in California and Elsewhere) or List 2 (Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere) of the CNPS *Inventory* (CNPS 2005, 2023). Species on CNPS List 3 (Plants About Which We Need More Information--A Review List), or List 4 (Plants of Limited Distribution--A Watch List) are considered to be of lower sensitivity, and generally do not fall under specific federal or state regulatory authority. Specific mitigation considerations are not generally required for species in these two categories.

Species of Special Concern

The CDFW maintains a list of animal "Species of Special Concern," most of which are species whose breeding populations in California may face complete destruction or extirpation (Bolster 1998, Shuford and Gardali 2008, Moyle et al. 2015, Thompson et al. 2016, CDFW 2023c, CDFW CNDDB 2023). Although these species have no legal status under the CESA, CDFW recommends considering these species during analysis of proposed project impacts to protect declining populations, and to avoid the need to list them as threatened or endangered in the future. These species may "be considered rare or endangered [under CEQA] if the species can be shown to meet the criteria."

[6] The CESA defines "take" as hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill (CFGC Section 86).

California Fish and Game Code and California Code of Regulations

California Fish and Game Code (CFGC) protects the active nests and eggs of birds from take, possession, or needless destruction (3503), and prohibits the take, possession, or destruction birds of prey (orders Falcinoformes and Strigiformes) and their eggs and nests (3503.5). The CFGC (Sections 86; 2000; 2002; 2014; 3000-3012; 4150) and several sections under Title 14 of CCR protect non-listed bat species and their roosting habitat, including individual roosts and maternity colonies (14 CCR Section 472). Section 86 of CFGC generally defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Other CFGC sections prohibit the willful take, capture, confinement, possession, or destruction of particular wildlife species, including bats and other non-game mammals. The CCR Title 14 provisions prohibit the take of nongame birds and mammals.

Fully Protected Species

The CFGC contains lists of vertebrate species designated as "Fully Protected" (CFGC 3511 [birds], 4700 [mammals], 5050 [reptiles and amphibians], and 5515 [fish]). This classification was the state's initial effort in the 1960's to identify and provide protection to those animals that were rare or faced possible extinction. Fully Protected species generally may not be taken or possessed at any time and no licenses or permits may be issued for their take except pursuant to an approved Natural Community Conservation Plan (NCCP) or for relocation of bird species, the protection of livestock, or the collection of those species necessary for scientific research. Impacts on these species are also considered under CEQA.

Western Bat Working Group Lists

The WBWG maintains a region-by-region matrix of the status of bat species throughout their western North American range. Bats that are designated as "High Priority" by the WBWG are "imperiled or are at high risk of imperilment" based on available information on distribution, status, ecology, and known threats (WBWG 2017). Bats may also be designated as medium-or low-priority. High Priority bat species qualify for legal protection under Section 15380(d) of the *CEQA Guidelines*.

Sensitive Habitats

Sensitive habitats include CDFW Sensitive Natural Communities (rank of S1 – S3), riparian corridors,[7] wetlands, and habitats for species that are protected under FESA, CESA, NPPA, or other rare species (CDFW 2023d). Sensitive habitats may also include areas of high biological diversity, areas providing important wildlife habitat, and vegetation types that are rare or unique to the region. CEQA also considers impacts to natural communities identified as sensitive in local and regional plans, regulations, and ordinances.

Wetlands and Waters of the State

CDFW Lake and Streambed Alteration Agreement. Jurisdictional authority of CDFW over relatively permanent bodies of standing or flowing water is established under Sections 1600-1616 of the CFGC, which pertains to activities that would disrupt the natural flow or alter the channel, bed, or bank of any

[7] A universally accepted definition of riparian habitat is not currently available; however, USFWS defines riparian areas as "plant communities contiguous to and affected by surface and subsurface hydrologic features of perennial or intermittent lotic and lentic water bodies (rivers, streams, lakes, or drainage ways). Riparian areas have one or both of the following characteristics: 1) distinctively different vegetative species than adjacent areas, and 2) species similar to adjacent areas but exhibiting more vigorous or robust growth forms. Riparian areas are usually transitional between wetland and upland" (USFWS 2019). See also Riparian Habitats under the Local Regulations section.

lake, river, or stream. The CFGC stipulates that "an entity may not substantially divert or obstruct the natural flow of, or substantially change…the bed, channel, or bank of, any river, stream, or lake" without notifying CDFW, incorporating necessary mitigation, and obtaining a Lake and Streambed Alteration Agreement. Any work which takes place below the break in bank or within the adjacent riparian canopy would be under the jurisdictional authority of CDFW.

CDFW has the opportunity to review projects and issue project conditions under CEQA and is also responsible for commenting on projects requiring USACE permits under the Fish and Wildlife Coordination Act of 1958. Federal lead agencies may also elect to notify CDFW according to Section 1602 and comply with the conditions and recommendations issued under this mechanism.

Porter Cologne Water Quality Control Act. The Porter-Cologne Water Quality Act assigns overall responsibility for water quality protection to the State Water Resources Control Board (SWRCB), and directs the nine statewide Regional Boards, who are tasked to develop and enforce water quality standards within their boundaries (SWRCB 2023). Under California state law, "Waters of the State" pertains to "any surface water or groundwater, including saline waters, within the boundaries of the state." As a result, water quality laws and permitting authority apply to both surface and groundwater. In the absence of a federal permit requirement, impacts to waters of the state, including wetlands, require a Waste Discharge Requirement (WDR) authorization from the Regional Board (SWRCB 2023).

California Wetlands Conservation Policy. Executive Order W-59-93 (1993) established the State of California's "no-net-loss" policy for wetlands, providing comprehensive direction for the coordination of state-wide activities for the preservation and protection of wetland habitats.

California Coastal Act

Under the Coastal Zone Management Act of 1972 and California Coastal Act of 1976, the California Coastal Commission is entrusted to review proposed development in the Coastal Zone with the goal of protecting and enhancing the coastal environment while allowing utilization and public access for coastal zone-dependent uses.

Under the Coastal Act, Environmentally Sensitive Habitat Areas (ESHA)[8] and wetlands are given special protection, with a different set of rules for each.

Protections for ESHA are as follows:

> [ESHA] *shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas. Development in areas adjacent to* [ESHA*]…shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat … areas.* [California Public Resources Code (PRC) §30240 as amended 1991]

In Coastal Act wetlands – all areas meeting at least one wetland parameter – a handful of specifically authorized uses, including "nature study" and "similar resource-dependent activities," are permitted, but

[8] Under the Coastal Act, ESHA is defined as "any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments."

only where there is no feasible less environmentally-damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects."

In *Bolsa Chica Land Trust v. Superior Court* (1999) 71 Cal.App.4th 493, 514-515, the California Court of Appeal held that, where an area in the Coastal Zone is both a wetland and an ESHA, the Coastal Act provision governing wetlands (§ 30233) controls, and the provision governing ESHA (§ 30233) does not also apply.

The Coastal Commission has approved several multi-use projects located in or adjacent to ESHA and wetlands, with identified goals of facilitating public access and protecting sensitive resources. In many of these approvals, the Commission determined that the public access, recreation, and educational benefits of the project were dependent on their location within the natural habitat. Interpretive signs and resource management plans were imperative to successfully protecting and enhancing sensitive habitats, while also improving public access in the Coastal Zone.

Based on the legal standards and Coastal Commission experience described above, the Proposed Program can comply with the Coastal Act as follows. Where a proposed improvement (e.g. natural surface trail) would pass through an ESHA, it must be designed to prevent "any significant disruption of habitat values." Where an improvement would be adjacent to ESHA, it must be "sited and designed to prevent impacts which would significantly degrade" the ESHA, and "be compatible with the continuance of" the ESHA. Where an improvement would be positioned in a wetland (e.g. boardwalk), "feasible mitigation measures" must be "provided to minimize adverse environmental effects"; and the overall alternative chosen must be the least environmentally-damaging feasible alternative with respect to wetlands effects.

The County of Santa Cruz has an approved Local Coastal Programs (LCP) for implementing the Coastal Act's mandate to protect ESHA and wetlands within the Coastal Zone, as described below.

5.3 LOCAL REGULATIONS

Santa Cruz County General Plan and Local Coastal Program

The Santa Cruz County General Plan and Local Coastal Program provides objectives and policies to protect biological resources (Santa Cruz County 1994). The language below is abridged from the LCP and contains those definitions and criteria relevant to this project:

- **Objective 5.1. Biological Resource Protection.** To maintain the biological diversity of the County through an integrated program of open space acquisition and protection, identification and protection of plant habitat and wildlife corridors and habitats, low-intensity and resource compatible land uses in sensitive habitats and mitigations on projects and resource extraction to reduce impacts on plant and animal life.
  - **Policy 5.1.2. Sensitive Habitat Definition.** An area is defined as a sensitive habitat if it meets one or more of the following criteria:

    (1) Areas of special biological significance as identified by the State Water Resources Control Board.

    (2) Areas which provide habitat for locally unique biotic species/communities including but not limited to: oak woodlands, coastal scrub, maritime chaparral, native rhododendrons and associated elkgrass, indigenous ponderosa pine, indigenous Monterey pine (Año Nuevo only), mapped native grassland in the Coastal Zone, sand parkland, and special forests including San Andreas Oak Woodlands, and ancient forests.

(3) Areas adjacent to essential habitats of rare, endangered or threatened species as defined in subsections (5) and (6) of this definition.

(4) Areas which provide habitat for species of special concern as listed by the California Department of Fish and Game in the special animals list, natural diversity database.

(5) Areas which provide habitat for rare or endangered species which meet the definition of Section 15380 of the California Environmental Quality Act guidelines.

(6) Areas which provide habitat for rare, endangered, or threatened species as designated by the State Fish and Game Commission, United States Fish and Wildlife Service or California Native Plant Society.

(7) Nearshore reefs, rocky intertidal areas, seacaves, islets, offshore rocks, kelp beds, marine mammal hauling grounds, sandy beaches, shorebird roosting, resting and nesting areas, cliff nesting areas and marine, wildlife or educational/research reserves.

(8) Dune plant habitats.

(9) All lakes, wetlands, estuaries, lagoons, streams, and rivers.

(10) Riparian corridors.

- **Policy 5.1.3. Environmentally Sensitive Habitat Area (ESHA) Protection.** Designate the areas described in 5.1.2 (d) through (J) as Environmentally Sensitive Habitats per the California Coastal Act and unless other uses are:
  (a) consistent with habitat protection policies and serve a specific purpose beneficial to the public;
  (b) it is determined through environmental review that any adverse impacts on the resource will be completely mitigated and that there is no feasible less-damaging alternative; and
  (c) legally necessary to allow a reasonable economic use of the land, and there is no feasible less-damaging alternative.

- **Policy 5.1.6. Development in Sensitive Habitats.** Sensitive Habitats shall be protected against a significant disruption of habitat values; and any proposed development within or adjacent to these areas must maintain or enhance functional capacity of the habitat. Reduce in scale, redesign, or if no other alternative exists, deny any project which cannot sufficiently mitigate significant adverse impacts on sensitive habitats unless approval of project is legally necessary to allow a reasonable use of the land.

Santa Cruz County Sensitive Habitat Protection Ordinance

The County of Santa Cruz Sensitive Habitat Protection ordinance (Section 16.32) is intended to "minimize the disturbance of biotic communities which are rare or especially valuable because of their special nature or role in an ecosystem, and which could be easily disturbed or degraded by human activity." Sensitive habitats under the Santa Cruz County Code include but are not limited to those listed above.

The project is required to mitigate any unavoidable environmental impacts to sensitive habitats. The ordinance calls for protection of sensitive habitats "undisturbed by the proposed development activity" or on an adjacent parcel through measures such as conservation easements. Additionally, restoration "commensurate with the scale of the proposed development" is required for degradation of sensitive

habitats caused by the project. Exemptions to this ordinance may be granted concurrently with authorized riparian exceptions.

Conditions for this portion of the ordinance include a "100-foot buffer measured from the high-water mark" and "distance between structures and wetland shall be maximized".

Santa Cruz County Riparian Corridor and Wetlands Protection Ordinance

The County of Santa Cruz Riparian Corridor and Wetlands Protection (16.30) limits development activities in riparian areas[9] and provides buffer/setback requirements[10] based on slope and vegetation composition. The Santa Cruz County Planning Commission may authorize a riparian setback exception on a case-by-case basis. Exceptions are granted pending an approved application stating the applicant's proposed activities, best management practices (BMPs), and measures for mitigating impacts to the riparian corridor.

Santa Cruz County Significant Tree Ordinance

The County of Santa Cruz requires a permit for the removal of "significant trees" in the Coastal Zone (County Code §16.34). Within the urban and rural services line, significant trees are those greater than 20 inches in diameter at breast height (DBH) for single stemmed trees; any sprout clump of five or more stems each of which is greater than 12 inches DBH; or any group consisting of five or more trees on one parcel, each of which is greater than 12 inches DBH. Outside the urban services or rural services line where visible from a scenic road, any beach, or within a designated scenic resource area, significant trees include those equal to or greater than 40 inches DBH (approximately 10 feet in circumference); any sprout clump of five or more stems, each of which is greater than 20 inches DBH (approximately five feet in circumference); or any group consisting of 10 or more trees on one parcel, each greater than 20 inches DBH. No stipulations are made for native versus non-native and/or ornamental trees. Exceptions are made for trees that are diseased or deemed hazardous to public safety; or pursuant to a Timber Harvest Plan or Fire Protection Plan submitted to and approved by the California Department of Forestry. Removal of significant trees would require a permit issued by the County of Santa Cruz Planning Department and would likely require mitigation including, but not limited to, planting of replacement trees at a ratio and species composition determined by the Planning Department.

6.0 RESULTS

6.1 FLORISTIC INVENTORY AND HABITAT CHARACTERIZATION

An EcoSystems West botanist recorded a total of 152 species of vascular plants within the Study Area. A complete species list of plants encountered during the site visit is presented in **Appendix D**. Seventy (70) of these identified species are native, and 82 species are non-native. Of the non-native species, 26 are considered invasive species with potential for "moderate" or "high" ecological impacts by the California Invasive Plant Council (Cal-IPC 2023).

No special-status plant species were observed in 2020 and 2021 within the Study Area during focused rare plant surveys or other site visits in subsequent years during the blooming period for target species. Two

[9] The Santa Cruz County Code defines riparian vegetation/woodland as "those plant species/woody plant species that typically occur in wet areas along streams or marshes" (Santa Cruz County Code 16.30.030). See also USFWS definition of riparian habitat under the Sensitive Habitats section (USFWS 2009).

[10] The ordinance states that a buffer "shall always extend 50 feet beyond the edge of riparian woodland for perennial streams and 20 feet beyond the edge of other woody vegetation as determined by the dripline" (Section 16.3.040).

special-status plants, Santa Cruz tarplant and Congdon's tarplant, were considered to have a "high" potential for occurrence within the Study Area due to the proximity of known occurrences, edaphic conditions, suitable habitat types, disturbance regime, and designation of federal Critical Habitat for Santa Cruz tarplant. Although not observed during focused rare plant surveys these species are discussed in detail below.

Santa Cruz Tarplant (Holocarpha macradenia)

Santa Cruz tarplant (*Holocarpha macradenia*) is listed as a Federal Threatened (FT), State Endangered (SE), and CNPS California Rare Plant Rank (CRPR) 1B.1 rare plant species with extant populations occurring on flat to gently sloping marine terraces. Santa Cruz tarplant is an herbaceous annual in the Asteraceae (composite) family with a blooming period from June to October. Flowering individuals are usually most recognizable June through early August when individuals are mature with multiple branching flowerheads, and competing annual grasses and forbs have senesced. This species is known to occur primarily in Santa Cruz County and northern Monterey County with several disjunct occurrences in western Contra Costa County. In 2002, USFWS designated 2,902 acres of Critical Habitat for the species with emphasis on coastal terrace prairie with suitable soil types including Watsonville, Tierra, Elkhorn, Santa Inez, and Pinto Series. Commonly associated native plants include purple needlegrass (*Stipa pulchra*), California oatgrass (*Danthonia californica*), tarweeds (*Hemizonia* spp., *Centromadia* spp.), rushes (*Juncus* spp.), golden brodiaea (*Tritilea ixioides*), and blue-eyed grass (*Sisyrinchium bellum*). In general, Santa Cruz tarplant requires regular disturbance or compacted soils with reduced competition from annual, invasive grasses for germination and persistence in the landscape. Grazing, mowing, and/or burning are effective methods for maintaining or restoring Santa Cruz tarplant populations.

The nearest extant population of Santa Cruz tarplant is located at 521 Harkins Slough Road (High Ground Organics) in approximately 40-acres of open grassland placed in a conservation easement by the previous property owner (Open Space Alliance) in 2000. Population estimates vary annually and active management including grazing, seeding, and outplanting, was undertaken by Laura Kummerer and Watsonville Wetlands Watch from 2006 through 2010, with additional management undertaken intermittently through the present. The largest annual population at this occurrence was observed in 2009, totaling 205 individuals. Santa Cruz tarplant was not observed at this location from 1993 until 2005 when 108 individuals were observed growing in a small patch in thin, clay soils on the edge of a grassland restoration project area. It is presumed the seedbank of longer-lived ray flower achenes remain dormant for 15 years or more until conditions are optimal for germination.

The Community Harvest Program Area is situated within USFWS designated Critical Habitat for the Santa Cruz Tarplant. However, despite focused rare plant surveys on the property, including in July 2020 by EcoSystems West, Santa Cruz tarplant has never been observed within the Program Area or the surrounding biological Study Area. It remains possible, albeit unlikely, that dormant SC tarplant seedbank(s) are present with the WSF Community Harvest Program Area. However, the majority of grasslands remaining on the property were previously in row crop agriculture for many decades, and tilling and other farming practices likely displaced remaining viable seed from the Study Area.

Congdon's Tarplant (Centromadia parryi ssp. congdonii)

Congdon's tarplant is a listed by the CNPS as CRPR 1B.2 and occurs in mesic, often disturbed, grasslands and seasonal wetlands with heavy clay, saline, or alkaline soils. This annual herb in the Asteraceae family typically grows in dense colonies with individual plants growing to seven (7) decimeters (28 inches) with erect to spreading stems originating from a basal rosette. Congdon's tarplant is identified from very similar-appearing common tarweed (*Centromadia pungens* ssp. *pungens*) by the presence of disk pappus and a lightly bluish-green coloration to the spiny secondary leaves. This species is relatively widespread

and endemic to Central California occurring in San Luis Obispo, Monterey, Santa Clara, San Mateo, Alameda, Contra Costa, Solano, and Santa Cruz counties with a small extant occurrence mapped in close proximity to the Community Harvest Study Area on the upper western embankment of Harkins Slough immediately east of the County of Santa Cruz Buena Vista Landfill.

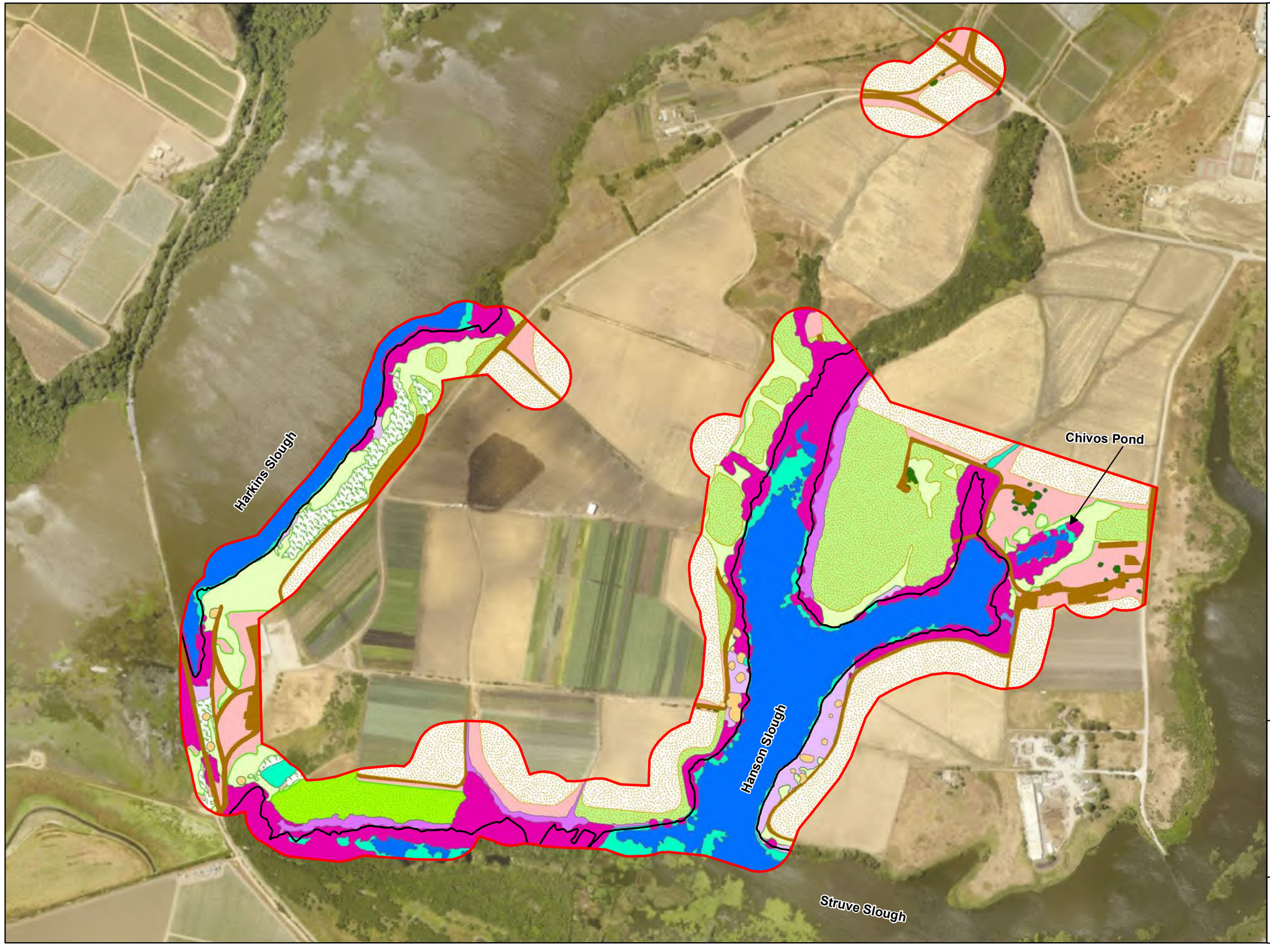
Several common tarweed individual plants were observed during the July 2020 focused rare plant survey; however, Congdon's tarplant was not observed in the vicinity of the Study Area this time or during subsequent site visits during the blooming period for this species. While there remains limited potential for this species to occur within the Study Area, implementation of the Community Harvest Program is not expected to impact Congdon's tarplant or its habitat.

6.2 NATURAL VEGETATION COMMUNITIES AND HABITAT TYPES

The majority of the Program Study Area consists of agricultural fields, ruderal, developed areas, and non-native grassland. Non-native ornamental trees including eucalyptus, fruit trees, palms, and Peruvian peppertree are found throughout the Study Area near developed areas and former residences including the caretaker facility near Chivos Pond. The proposed Program amenities include boardwalks with integrated fish screens across the west and east branches of Hanson Slough, a large open non-tidal body of fresh water with emergent wetland and riparian vegetation and along the margins.

We recognize eleven (11) predominant habitat types occurring within the Study Area (**Figure 3**):

- Non-native grassland (*Bromus* spp.-*Avena* spp. Alliance and *Phalaris aquatica-Phalaris arundinacea* Alliance)
- Restored native (coastal prairie) grassland (*Stipa =[Nasella] pulchra* Alliance)
- Coast live oak woodland (*Quercus agrifolia* Alliance)
- Coastal scrub (*Toxicodendron diversilobum* Alliance and *Baccharis pilularis* Alliance)
- Mixed willow riparian and wetland forest (*Salix lasiolepis* Alliance and *Salix lucida* ssp*. lasiandra* [=*S*. *lasiandra*] Alliance)
- Palustrine emergent (seasonal wetland, freshwater emergent marsh, road wetland) and scrub-shrub wetlands
- Aquatic
- Agricultural fields
- Ornamental trees
- Ruderal (mixed herbaceous and poison hemlock)
- Developed



ECOSYSTEMS WEST CONSULTING GROUP

Figure 3.

Habitat Types and Natural Plant Communites

Watsonville Slough Farms Community Harvest Project

- Biological Study Area
- Aquatic-Open Water
- Freshwater Emergent Marsh
- Road Wetland
- Scrub-Shrub Wetland
- Seasonal Wetland
- Mixed willow forest
- Coyote brush scrub
- Poison oak-Blackberry scrub
- Coast live oak
- Non-native grassland
- Restored native grassland
- Agriculture
- Ornamental trees
- Ruderal- Poison hemlock
- Ruderal- Mixed herbaceous
- Developed
- Watsonville Sloughs OHWM

N W E S

1 inch=550 feet

0 250 500 1,000 Feet

Drawn By: J. Davilla, ESW
Date: 3/13/2023
Filepath: E:\Watsonville Slough Farms
Image: ESRI Basemap

Within the proposed WSF Community Harvest Program Study Area, non-native grassland, agricultural fields, ruderal, developed, and ornamental habitats are considered "non-native", as they are typically associated with heavy, ongoing, or periodic human disturbance; and the majority of this vegetation is naturalized or has been introduced, oftentimes intentionally. The mixed willow riparian and scrub-shrub wetland, coast live oak, coastal scrub, aquatic, and palustrine emergent wetland habitats are generally considered native as they do not exist solely as a result of human influence and support a preponderance of native plant species. However, historic and contemporary disturbances have altered these habitat types; therefore, non-native species usually occur and may even be dominant within these areas. This property has been the subject of extensive habitat restoration efforts, including direct planting of riparian forest, coast live oak coastal scrub, wetland, and coastal prairie grassland vegetation. Most of these restoration efforts have occurred since 2010, however some riparian plantings date to the late 1990s. Restoration of native grassland was implemented relatively recently and continues to be actively managed (e.g., mowing, prescribed fire, weed eradication, seeding) and therefore, is not considered a steady-state, sustainable natural community at this time.

Non-Native Grassland

Within the Study Area, the non-native grassland habitat type corresponds to the *Avena* spp.-*Bromus* spp. (42.027.00; GNA/SNA) and *Phalaris aquatica* (42.051.00; GNA/SNA) Semi-natural Herbaceous Alliances of Sawyer et al. (2009) and CDFW (2023c) and to a phase of the non-native grassland type described by Holland (1986). Within the Study Area, some non-native grasslands are also undergoing colonization of coyote brush (*Baccharis pilularis*), a native woody shrub, and others are invaded by poison hemlock (*Conium maculatum*). Where poison hemlock forms dense monospecific stands, these areas are characterized as ruderal or seasonal wetland, depending on local hydrology, landscape position, and edaphic (soil) properties. Non-native grasslands represent an early successional stage following cessation of ongoing management (e.g., grazing, mowing, etc.) and, other than colonizing coyote brush are comprised almost entirely of invasive and/or non-native grasses and forbs. Where coyote brush cover exceeds 10 percent areal cover, this habitat type is described below as coastal scrub (*Baccharis pilularis* Alliance).

Non-native grassland occurs in several area including east of Chivos Pond west of Lee Road; on a moderately sloped knoll between the East Branch and West Branch of Hanson Slough; along the riparian ecotone west of Hanson Slough; and, in the northern portion of the Study Area immediately east of Harkins Slough. Non-native grasslands are comprised primarily of weedy, non-native grasses and forbs of Eurasian origin. It is important to note that in more mesic coastal sites, non-native grassland often contains a higher percentage of perennial species than more interior locations. In particular, invasive Harding grass (*Phalaris aquatica*) is locally abundant, in some instances forming dense, monospecific stands. Harding grass is especially prevalent east of the former Cypress Hilltop homesite on the slope above the East Branch of Hanson Slough.

Non-native grassland is dominated by wild oats (*Avena barbata*), Harding grass, soft chess (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), six weeks fescue (*Festuca bromoides*), Italian ryegrass (*Festuca perennis*), common barley (*Hordeum murinum* ssp. *leporinum*), black mustard (*Brassica nigra*), common mustard (*Brassica rapa*), wild radish (*Raphanus sativus),* cutleaf plantain (*Plantago coronopus*), English plantain (*P. lanceolata*), sheep sorrel (*Rumex acetosella*), cutleaf geranium (*Geranium dissectum*), poison hemlock, and small aggregations of coyote brush. A large percentage of plant species identified within this habitat type are listed as invasive weeds with "moderate to high ecological impacts" by the California Invasive Plant Council (Cal-IPC 2023) including poison hemlock (*Conium maculatum*), fennel (*Foeniculum vulgare*, wild oats, thistles, wild radish, and mustards (**Appendix B**).

Many bird species utilize contiguous non-native grassland to forage and hunt for invertebrates, seeds, and/or small mammals. Some species utilize grassland habitats for nesting, such as mourning dove *(Zenaida macroura)*, western meadowlark *(Sturnella neglecta)*, song sparrow (*Melospiza melodia*), and northern harrier (*Circus hudsonius*). Southwestern pond turtle, known to occur within the Study Area, may utilize non-native grassland adjacent to aquatic habitats for nesting in the spring. Numerous small mammal burrows were present within the grassland habitat. Botta's pocket gopher (*Thomomys bottae*), ground squirrel (*Otospermophilus beecheyi*), and California meadow vole (*Microtis californicus*) commonly occur in non-native grassland, along with lizards such as coast range fence lizard (*Sceloporus occidentalis bocourtii*). These species in turn provide prey for garter snake (*Thamnophis* sp.), gopher snake (*Pituophis catenifer catenifer*), and raptors, along with bobcat (*Lynx rufus*) and coyote (*Canis latrans*). Mammal burrows are also utilized by common and sensitive amphibian and reptile species for refuge. We observed the scat of black-tailed deer (*Odocoileus hemionus*) within the non-native grassland. The scattered coyote brush provides structural diversity as well as additional food sources, refuge, and nesting habitat. Brush rabbit (*Sylvilagus bachmani*) are likely to utilize the coyote brush for cover. The edge habitats[11] or ecotones, between non-native grassland and adjacent coastal scrub, oak woodland, riparian, and slough habitats, are particularly productive and provide a range of foraging, refuge, and nesting opportunities for wildlife species.

We documented a number of bird species utilizing the non-native grassland habitat of the Study Area for foraging and breeding activities (**Appendix E**).

Restored Native (Coastal Prairie) Grassland

Coastal prairie grassland is a unique herbaceous plant community corresponding to the *Stipa pulchra* Herbaceous Alliance of CDFW (2023c) and to a phase of the Coastal Terrace Prairie community type described by Holland (1986). Intact coastal prairie is typically dominated by native perennial grasses with widely-scattered annual and perennial forbs. Due to past anthropogenic disturbance, including cultivation and domestic livestock grazing that began with Spanish colonization in the late 1700s, the majority of remaining native coastal prairie vegetation has largely been displaced by non-native annual grasses and forbs of Eurasian origin. Presently, much of California's historic coastal prairies have been lost to development and agriculture. Remaining coastal prairie habitat is typically located in close proximity to the coast, in areas with annual rainfall exceeding 25 inches and cooler summer temperatures due to the influence of persistent coastal fog. This habitat type is dependent on periodic disturbance that includes grazing, mowing, and/or fire that support germination of native prairie species and prevent natural succession to woody shrub and tree dominated plant communities. It should be noted, however, that the type and extent of disturbance may be either beneficial or detrimental to coastal prairie structure and function.

Within the Study Area, naturally occurring coastal prairies were displaced for agricultural production beginning in the early 20th century. Presently, areas left fallow and allowed to return to a natural state are dominated by ruderal and non-native grassland habitats. Beginning in 2012, the LTSCC and Watsonville Wetlands Watch partnered to implement the Watsonville Slough Farms Management Plan (Santa Cruz RCD 2012) which included efforts to restore approximately 5.3 acres of degraded, fallow agricultural fields to native coastal prairie located immediately northwest of the confluence of Struve Slough and the West Branch of Hanson Slough. The work included hand and drill seeding native species including purple needlegrass, meadow barley (*Hordeum brachyantherum*), California brome (*Bromus sitchensis* ssp.

[11] Edge habitats occur when two or more habitat types abut one another. Edge habitats provide an abundance and variety of food sources because they have diverse plant species and microhabitat variability, including cover, shelter, and shade, as well as sun exposure for warmth and air flow for circulation.

carinatus), creeping wildrye (*Elymus triticoides*), blue wildrye (*Elymus glaucus*), California poppy (*Eschscholzia californica*), and blue-eyed grass (*Sisyrinchium bellum*). In Fall 2020, this area was also subjected to a controlled burn in partnership with the Central Coast Prescribed Burn Association. As is typical with restored coastal prairie habitats, a substantial proportion of vegetation is composed of non-native annual grasses and forbs commonly found in areas described as non-native grassland including wild oats, brome grasses, cutleaf geranium, English plantain prickly ox tongue (*Helminthotheca echioides*), and sow thistle (*Sonchus oleraceus*).

Native coastal terrace prairie indicator species have high rates of endemism (i.e., limited to a specific geographic location), and many are considered rare or having limited distribution within California. However, restored systems are not considered protected sensitive habitats until they are sustainable without intensive ongoing restoration and/or planting efforts.

The wildlife species described above under Non-native Grassland are likely to utilize restored native grassland for nesting, foraging, hunting and refuge.

Coast Live Oak Woodland

In the Study Area, coast live oak forest closely corresponds to the *Quercus agrifolia* Alliance and *Quercus agrifolia/Toxicodendron diversilobum* Association of Sawyer et al. (2009) and CDFW (2023c), and to the Central Coast phase of the coast live oak forest type described by Holland (1986). The overstory is comprised entirely of coast live oak (*Quercus agrifolia*) with a dense understory dominated by the non-poison oak and California blackberry. Other common understory associates include red elderberry stinging nettle, miner's lettuce (*Claytonia perfoliata*), and poison hemlock.

Coast live oak woodland in the Study Area is limited and fragmentary, occurring only in several small areas. The most notable stand occurs close to the proposed trail alignment above the West Branch of Hanson Slough. The coast live oak woodland is situated on a steep embankment in a habitat mosaic comprised of mixed willow riparian forest, freshwater marsh, agricultural fields, and coastal scrub. Within this narrow zone, the overstory canopy patchy but dominated by very large, multi-trunked oaks. Another small patch of coast live oak forest occurs near the southern terminus of Harkins Slough immediately west of the Little Bee Barn. In this area, the canopy is mostly closed and supports several very mature oaks with an understory of invasive grasses and poison hemlock.

The coast live oak woodland within the Study Area consists of diverse dense mature forest, rich in habitat features, such hollows, crevices, pealing bark, and multiple tiers of branches. Numerous bird species are likely to use this habitat type for nesting, including insectivorous, cavity-nesting, and ground-nesting birds. Foliage and crevice roosting bats are also likely to be present. Striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), and opossum (*Didelphis virginiana*) may use this habitat type for denning, foraging, cover, and refuge.

Coastal Scrub

The coastal scrub habitat type in the Study Area is typified by low to moderate sized woody shrubs with mesophilic leaves and small diameter flexible branches. These shrubs are often relatively short-lived with a shallow root structure and typically occur in shallow, often rocky soils. Due to marine influence, soils tend to be higher in concentration in salts than more inland areas. Coastal scrub tends to persist as a climax seral state in areas with cool, mesic microclimates and persistent fog. Growth habits of dominant shrubs range from shrubby to arboreal. Within the Community Harvest Study Area, this habitat type corresponds to a phase of northern coastal scrub habitat type (Holland 1986) and various vegetation

alliances depending on dominant species composition (Sawyer et al. 2009, CDFW 2023c), including the *Baccharis pilularis* (32.060.00; G5/S5) *and Toxicodendron diversilobum* (37.940.00; G4/S4) Alliances*,* with *Rubus ursinus* sub-dominant in both assemblages. These CDFW Vegetation Alliances are described in detail below, within the broader coastal scrub habitat type, including specific dominant species associations in each alliance.

Structure and composition of coastal scrub is variable throughout the Study Area. Differing relative cover of native and non-native species often corresponds to disturbance regimes, proximity to urbanized development (e.g., roads, structures, agriculture), microclimate, topographic position, and edaphic properties (Barbour et al. 2007). In general, areas dominated by coastal scrub are dense with mostly closed canopy, but openings consist of a diverse mix of native and non-native grasses and forbs. Hydrophytic plants occur in mesic areas of coastal scrub where moisture is persistent at or near the ground surface for extended periods of times and often intergrades with native mixed willow forest and oak woodland habitats.

The coastal scrub provide habitat for a range of wildlife species, offering varied food sources, cover from predators, and shelter. The coastal scrub habitats are in proximity to the sloughs, riparian and woodland habitats, as well as to open areas such grasslands and agricultural fields. Habitat mosaics and reliable water sources increase the habitat value of these coastal scrub habitats for wildlife.

Numerous bird species were observed using the coastal scrub for perching, foraging, and nesting, such as song sparrow, goldfinch species, California towhee, Anna's hummingbird, and other species listed in **Appendix E**.

Coastal scrub is a preferred habitat for small mammals, such as brush rabbit (*Sylvilagus bachmani*). Skunks may use the coastal scrub for cover. Coast range fence lizard was also observed in this habitat.

***Baccharis pilularis* Alliance.** In the Study Area, the *Baccharis pilularis* Alliance (32.060.00; G5/S5) primarily describes areas that are dominated by patchy to dense assemblages of early-successional stands of coyote brush with annual grasses co-dominant (*Baccharis pilularis*/Annual Grass-herb Association, 32.060.20; G5/S5). This habitat type intergrades with non-native grassland and poison hemlock-dominated ruderal areas along the eastern margin of Harkins Slough northwest of the Little Bee Barn. Coyote brush appears to have recently colonized this area following cessation of maintenance of an access existing road. Other shrubs including poison oak (*Toxicodendron diversilobum*), California blackberry (*Rubus ursinus*), and coffeeberry (*Frangula californica*) are also present along the steeper embankments supporting this habitat type, but the majority of associated vegetation consists of weedy, opportunistic species including Bermuda buttercup (*Oxalis pes-caprae*), poison hemlock, fennel, and wild radish, and mustards.

***Toxicodendron diversilobum* Alliance.** The *Toxicodendron diverislobum* Alliance (37.940.00; G4/S4) is dominated by dense thickets of poison oak and shares many similarities the *Baccharis pilularis* Alliance described above. Common associates include weedy grasses, forbs, and woody vines and shrubs including California blackberry, coffeeberry, and black elderberry (*Sambucus nigra*) poison hemlock. Periwinkle (*Vinca major*), manroot (*Marah fabacea*), Italian thistle (*Carduus pycnocephalus*), milk thistle (*Silybum marianum*), dogwood (*Cornus sericea*), common snowberry (*Symphoricarpos albus*), prickly ox tongue, and short pod mustard (*Hirschfeldia incana*) and also prevalent in this vegetation community. Within the Study Area this habitat type is primarily found on the moderate to relatively steep embankments above both the East and West Branches of Hanson Slough adjacent to coast live oak woodland, mixed willow riparian, and emergent marsh habitats.

Mixed Willow Riparian (Coastal Act Wetland) Forest

Along the border of the Watsonville Sloughs, riparian vegetation corresponds to the central coast arroyo willow riparian forest habitat type (Holland 1986), although Holland does not recognize this type north of Monterey County, and the *Salix lasiolepis* Alliance and Association and *Salix lucida* ssp. *lasiandra* [=*S. lasiandra*] Alliance of Sawyer et al 2009 and CDFW 2023c). Tree-sized arroyo willow (*Salix lasiolepis*) and Pacific willow (S. lucida) dominate this riparian forest habitat type. Red willow (*Salix laevigata*) is also present but relatively uncommon. In several areas, including along the West Branch and East Branch of Hanson Slough, dogwood (*Cornus sericea*), cottonwoods (*Populus fremontii*, *P. trichocarpa*), and black elderberry are common associates. (These more diverse areas were part of the restoration projects of the late 1990s and early 2010s.) The arborescent to arboreal canopy is typically dense and often impenetrable, although openings of various sizes occur locally and support patches of herbaceous vegetation. The native, woody vine forms of California blackberry and poison oak are prevalent in the understory where prolonged soil saturation and/or inundation is lacking.

The riparian vegetation supports a suite of wildlife species, including insects, amphibians, birds, and mammals. Sierran chorus frog (*Pseudacris sierra*) is known to occur in these habitats, as well as non-native American bullfrog (*Lithobates catesbeiana*). Migratory and resident bird species utilize the riparian habitat adjacent to the sloughs (**Appendix E**). Riparian habitats provide a dense multi-tiered canopy with diverse foraging, roosting, sheltering, and/or nesting habitat for birds and are important stopover sites for migratory bird species. The riparian vegetation provides cover from predators and insulating properties that shelter wildlife species from the sun and prevailing weather patterns. Foliage-roosting bat species may roost in these habitats and hunt over the adjacent sloughs.

The riparian vegetation also buffers the adjacent aquatic habitat contributing shade, food, and sources of nutrients to the sloughs and aquatic wildlife species. Structurally, downed trees and willow mats create microhabitats that are important for birds, amphibians, and aquatic insects.

Palustrine Emergent and Scrub-Shrub Wetlands

Wetlands are those areas that are transitional between aquatic and terrestrial systems, where surface water is at a depth and duration sufficient to promote the development of hydric soils and a preponderance of hydrophytic wetland vegetation. Within the Study Area, palustrine emergent wetland types include seasonal wetland, seep wetland, and emergent freshwater marsh associated with Hanson Slough, Harkins Slough, and Struve Slough.

Seasonal wetlands are characterized by shallow depressional topography with inundation and/or saturation only occurring during the rainy season. These features are typically dominated by annual and perennial grasses and forbs, many of which may occur in both wetland and upland habitats (i.e., FAC species). Four seasonal wetlands totaling 3.76 acres were identified within the greater Study Area. A portion of one of these seasonal wetlands totaling 0.01 acres is located within the development footprint of Community Harvest Program Improvement Areas. One additional disturbed/atypical[12] seasonal wetland occurs on an active farm road southeast of Community Harvest Gateway west of Lee Road and east of Hanson Slough. This depressional area is mostly unvegetated due to being situated on a dirt road but would rapidly develop cover by hydrophytes if undisturbed. These wetlands occur primarily east (upslope) of the mixed willow riparian forest along the West Branch of Hanson Slough. An additional seasonal wetland dominated entirely by poison hemlock and curly dock occurs along west shoreline of

[12] Atypical wetlands include areas where one or more parameters absent due to recent human activity or natural event.

the West Branch of Hanson Slough near proposed Boardwalk Crossing A and east (downslope) of the Cypress Hilltop Picnic Area. Seasonal wetlands were dominated by weedy grasses and forbs including Italian ryegrass (*Festuca perennis;* FAC), flatsedge (*Cyperus eragrostis;* FACW), meadow barley (FACW), bitter dock (*Rumex obtusifolia*, FAC) creeping wildrye (FAC), common plantain (*Platago major; FAC*), and Santa Barbara sedge (*Carex barbarae,* FAC). Direct hydrologic indicators demonstrate that the marginal features do not appear to flood regularly and are likely saturated continuously for relatively short durations during the rainy season.

Emergent freshwater marsh totaling 6.42 acres occurs along the shoreline fringe and within shallow areas throughout the inundated portions of the Watsonville Sloughs encompassed by the greater Community Harvest Study Area. A total of 0.06 acres of freshwater marsh occurs within the Community Harvest Program development footprint. These marshy areas are dominated entirely by perennial, emergent wetland vegetation including cattails (*Typha latifolia,* OBL), bulrush (*Schoenoplectus californica,* OBL), western goldenrod (*Euthamia occidentalis,* FACW), broadfruit bur-reed (*Sparganium eurycarpum,* OBL*),* marsh pennywort (*Hydrocottle ranunculoides*, OBL) and water smartweed (*Polygonum amphibium,* OBL). Additional emergent vegetation is comprised of dense mats of duckweed (*Lemna* spp., OBL) and mosquito fern (*Azolla filliculoides*; OBL). The majority of these areas are recovering from past agricultural activities including draining and farming the majority of the slough bottomlands in the vicinity of the Program Area. Hydrology was restored to the sloughs and naturalized vegetation was allowed to reestablish in the early 2000s. Active restoration is currently being undertaken by various resource agencies and land management organizations including the Land Trust of Santa Cruz County, Watsonville Wetlands Watch, CDFW, USFWS, and the City of Watsonville.

One scrub-shrub wetland dominated by California blackberry (FAC), Himalayan blackberry (*Rubus armeniacus,* FAC), and stinging nettle (Urtica dioica; FACW) is contiguous with the disturbed/atypical seasonal farm road wetland described above. This feature consists of a dense, nearly impenetrable thicket of blackberry, poison oak, and stinging nettle and intergrades with mature mixed willow riparian habitat to the west.

During the rainy season, the seasonal wetlands and scrub-shrub wetland may provide hydration points or refuge for amphibian species such as chorus frog (*Pseudacris sierra*) and California red-legged frog (CRLF) (*Rana Draytonii*). Freshwater marsh habitat within the Study Area provides habitat for amphibians and numerous bird species (**Appendix E**).

Aquatic

Aquatic habitat is composed of unvegetated, natural and man-made open bodies of water. Aquatic open water habitat is limited to Hanson Slough, Harkins Slough, Struve Slough, Watsonville Slough, and Chivos Pond. These features, once largely interconnected, are shallow, freshwater, non-tidal sloughs associated with the larger Watsonville Sloughs complex. No other open water habitats including ponds or streams are present within the Study Area; however, as part of routine agricultural operations, the Land Trust is currently siting two settlement detention basins at the toe of the slope above Hanson Slough to capture sediment runoff from adjacent agricultural fields prior to entering the sloughs.

The Watsonville Sloughs support invertebrates, native amphibians, and numerous shorebirds (**Appendix E**), as well non-native Louisiana crayfish (*Procambarus clarkii*), non-native American bullfrog, and introduced fish species: common carp (*Cyprinus carpio*), bullheads (*Ameiurus sp*), mosquitofish (*Gambusia affinis*), sunfishes (*Lepomis spp.*), largemouth bass (*Micropterus salmoides*). Muskrat (*Ondatra zibethicus*)

were observed during 2021 surveys. Together with the marsh and riparian habitats that border the slough, this feature offers important habitat values to wildlife species, providing water and food sources for birds and mammals, as well as shade and cover. Aquatic habitats in the area moderate the Mediterranean climate of the region, allowing wildlife to adjust to seasonal and climatic fluctuations.

Agricultural Fields

Much of the land within the Study Area is in certified-organic agricultural production of strawberries and row-crop vegetables. A portion of the agricultural fields are fallow each year and active cultivation is rotational. This agricultural land is referred to as Watsonville Slough Farms and is currently owned and leased by the Land Trust of Santa Cruz County.

The majority of these agricultural fields are considered "prime agricultural land" by the County of Santa Cruz and have been cultivated for decades. Present management includes dry season irrigation and tilling with heavy machinery. Watsonville Slough Farms are certified organic and herbicides and pesticides are not permitted in agricultural production areas. These agricultural areas have marginal habitat value and support limited naturalized vegetation (typically ruderal-mixed herbaceous) along the margins.

Agricultural fields are likely to support invertebrate and seed-eating bird species, as well as ground-nesting bird species, such as those listed in **Appendix E** and under the non-native grassland section above. Small mammals [such as Botta's pocket gopher, mice (*Peromyscus* sp.), and moles (*Scapanus sp.*) commonly occur in agricultural fields and buffers along with common lizard species. Agricultural fields are also likely to support higher trophic-level wildlife species that prey on small mammals and reptiles, as described in the non-native grassland habitat section above. Agricultural practices can result in injury or mortality of wildlife species, and agricultural fields lack abundant resources for wildlife. Therefore, in the overall landscape of the Study Area and surroundings, agricultural fields increase fragmentation and deter wildlife movement.

Ornamental Trees

Ornamental trees are located in former homesites and previously developed areas near the WSF entrance west of Lee Road, Cypress Hilltop Picnic Area, and near the Little Bee Barn. These consist of planted, non-native ornamental tree including blue gum and red gum eucalyptus (*Eucalyptus globulus, E. camaldulensis*), Monterey cypress (*Hesperocyparis macrocarpa*), fruit trees, and deodar cedar (*Cedrus deodara*). Several of these trees are considered "significant" by the County of Santa Cruz with a diameter at breast height (DBH) greater than 24 inches outside of the Urban Services Line.

The ornamental trees within the Study Area provide foraging, roosting, and nesting habitat for birds (**Appendix E**) and roosting habitat for common bat species.

Ruderal (Poison Hemlock and Mixed Herbaceous)

Ruderal areas are not described by Holland (1986), Sawyer et al. (2009), or CDFW (2023c). Within the Study Area, ruderal communities consist of highly disturbed, weedy areas immediately adjacent to roads, agricultural fields, and other developed or disturbed areas on the site. Vegetation is dominated by aggressive, opportunistic species including poison hemlock (*Conium maculatum*), fennel (*Foeniculum vulgare*), cheeseweed (*Malva parviflora*), pineapple weed (*Matricaria discoidea*), bindweed (*Convolvulus arvensis*), Bermuda grass (*Cynodon dactylon*), dog fennel (*Anthemis cotula*), Jersey cudweed (*Pseudognaphalium luteoalbum*), purple sand spurry (*Spergularia rubra*), and filarees (*Erodium spp*.).

Other ruderal areas are dominated are comprised of dense thickets of non-native Himalayan blackberry, wild radish (*Raphanus sativus*), and black mustard. In some instances, ruderal habitat in the Study Area may ultimately transition to grassland or coastal scrub habitats where ongoing disturbance regimes are permanently removed. However, due to the proximity to roads, agricultural activities, and other ongoing disturbances, ruderal areas tend to persist over time and succession to other natural communities is limited.

Ruderal (and developed) habitats support opportunistic bird species such as American crow *(Corvus brachyrhynchos*), barn swallow (*Hirundo rustica*), and house finch (*Haemorhous mexicanus*), as well as common mammal species such as skunk, raccoon, and squirrels.

Developed/Landscaped

Developed and landscaped areas include Lee Road, Harkins Slough Road, and other dirt and paved roadways, farm buildings (Little Bee Barn, Community Harvest Gateway Barn), and other infrastructure within the WSF property. Several historic buildings including a private residence at Cypress Hilltop, the Caretaker Facility west of Chivos Pond, as well as a barn and other outbuildings adjacent to Lee Road were removed by the LTSCC in 2019 leaving behind concrete slab foundations and paved driveways, the majority of which will be removed or repurposed for the Community Harvest Program. Paved areas and former buildings total approximately 3.1 acres.

Opportunistic wildlife species such as those listed above under Ruderal are likely to utilize developed habitats.

6.3 SENSITIVE HABITATS

Coast Oak Woodland

Coastal live oak woodland is considered ESHA by the County of Santa Cruz Local Coastal Program (LCP) (Santa Cruz County 1994) and County of Santa Cruz sensitive habitat (Santa Cruz County Code §16.32). This habitat type is also considered "Especially Valuable Habitat" by the California Coastal Commission based on the "special role" of this habitat to support a diversity of wildlife species including the San Francisco dusky-footed woodrat and protected avian species, including raptors.

Although fragmented, Coast live oak woodland supports large, multi-trunked Coast live oak trees and positioned immediately adjacent to aquatic, non-native grassland, mixed willow riparian, and coastal scrub habitats, thus representing a locally important function in the assemblage of ecotones or edge habitats[13]. These larger trees also provide habitat features for foliage-roosting and cavity-roosting bats and other species, as described in the *Floristic Inventory and Habitat Characterization* section above. These habitats may support the San Francisco dusky-footed woodrat, a CDFW Species of Special Concern (Bolster 1998, CDFW 2023d).

Minimal impacts are expected to coast live oak woodland along the West Branch of Hanson Slough. The majority of the proposed improvements, including new trail segments, are planned to be more than 100 feet from coast live oak woodland.

[13] Edge habitats occur when two or more habitat types abut one another. Edge habitats provide an abundance and variety of food sources because they have diverse plant species and microhabitat variability, including cover, shelter, and shade, as well as sun exposure for warmth and air flow for circulation.

Coastal Scrub

Coastal scrub is considered ESHA by the County of Santa Cruz Local Coastal Program (LCP) (Santa Cruz County 1994) and County of Santa Cruz sensitive habitat (Santa Cruz County Code §16.32). The *Toxicodendron diversilobum* Alliance (G4/S4) is not considered a sensitive habitat by CDFW; however, this assemblage appears to represent a stable, and species-rich seral state and is dominated by native shrubs with a rich assortment of native forbs in the understory. Therefore, areas comprised of the *Toxicodendron diversilobum* Alliance are considered ESHA under the County LCP and California Coastal Act and permanent impacts would require compensatory mitigation.

The *Baccharis pilularis* Alliance (G5/S5) is a common natural vegetation community that is not included as a sensitive habitat by CDFW. While there is potential to support breeding birds and San Francisco dusky footed woodrat, this habitat type is highly disturbed and has undergone repeated perturbations from agriculture and other development. In general, this Alliance describes areas within the Study Area that are in a relatively early successional state and recovering from recent disturbance, including agriculture. The nearly monospecific overstory of coyote brush is largely interspersed with opportunistic weedy grasses and forbs classified as invasive weeds by the California Invasive Plant Council, and lacks the structural heterogeneity and native species composition of undisturbed coastal scrub habitat types. Therefore, within the Study Area, the *Baccharis pilularis* Alliance is not considered an ESHA or EVH for the purposes of regulatory analysis and permitting.

Minimal impacts are expected to coastal scrub dominated by poison oak along the East Branch of Hanson Slough and in areas that intergrade with Coast live oak woodland resulting from new trail segment construction and usage. The majority of the proposed improvements, including new trail segments, are planned to be more than 100 feet from contiguous coastal scrub habitat.

Mixed Willow Riparian Forest

Mixed willow riparian forest and wetland habitat is considered an ESHA and sensitive habitat type by the County of Santa Cruz LCP, Sensitive Habitat Ordinance, and Riparian Corridor and Wetlands Protection Ordinance (Santa Cruz County Code §16.32). The *Salix lasiolepis-Salix lucida* Association [62.201.04; G3/S3? (Faber-Langendoen et al. 2012) is also described as a sensitive natural community by CDFW. Willow riparian forests are also regulated as one or two parameter wetland habitats by the California Coastal Commission when dominated by arroyo willow and Pacific willow, both facultative wetland (FACW) species. Riparian and woody wetland communities are considered sensitive habitat due to their value to wildlife, limited distribution, and decreasing acreages statewide. Riparian vegetation is critical for wildlife habitat, flood protection, stream bank stabilization, erosion control, and water quality related to nutrient and sediment filtration by riparian vegetation.

Within the Study Area, mixed willow riparian and wetland habitat primarily occurs along the margins of Harkins Slough, Hanson Slough, Struve Slough, Watsonville Slough, and Chivos Pond. It provides habitat and movement corridors for a variety of common and special-status wildlife species and this habitat's rich ecological values for wildlife are described in the *Floristic Inventory and Habitat Characterization* section above. Minimal permanent and temporary impacts to arroyo willow riparian forest are anticipated to result from the construction of the proposed Project and limited almost entirely to the Boardwalk/Fish Screen B.

Areas that Support Sensitive Species or High Biological Diversity

In addition to the habitat types listed above, areas that support sensitive species would also be considered sensitive habitats under the County of Santa Cruz LCP and Sensitive Habitat Ordinance. Within the Study Area, CRLF refuge, upland, movement and dispersal habitats would be considered sensitive habitats. CRLF are known to move directly between aquatic (breeding and non-breeding) habitats, and juvenile frogs may disperse from their natal habitat in all directions. Upland habitat for CRLF would include the sensitive habitats listed above as well as restored native grassland, non-native grassland, coyote brush scrub, and fallow agricultural fields, particularly those areas in proximity and/or between aquatic habitats.

Edge habitats within the Study Area would be considered areas of high biological diversity and are therefore sensitive habitats. In addition to transitions between the sensitive habitats listed above, ecotones between restored native grassland, coyote brush scrub, and non-native grassland would also be considered sensitive habitats. Many native bird and rodent species utilize edge habitats for cover, shelter, foraging and nesting. Predators, including predatory birds, in turn hunt in these edge habitats.

Potential Wetlands and "Other Waters" of the U.S.

Four seasonal wetlands totaling 3.76 acres were identified within the northernmost portion of the Study Area near the gated entrance to the CDFW Reserve by Harkins Slough Road. Of these 0.01 acres are within the area proposed for Program improvements within the east landing area of Boardwalk B. An additional 0.005-acre depression on an existing dirt farm road immediately south of the Community Harvest Gateway. This wetland is largely unvegetated due to vehicle traffic but would quickly form wetland characteristics if left unmanaged and is considered a potentially jurisdictional disturbed/atypical wetland. Adjacent to this feature immediately west of the road edge, the wetland transitions into a 0.01-acre scrub-shrub wetland dominated by California blackberry (FAC) and stinging nettle (*Urtica dioica*; FACW).

Additionally, 6.65 acres of emergent freshwater marsh were identified within the greater Study Area. However, only 0.03 acres of marsh are located within Community Harvest Program Improvement Areas including Boardwalk B and the Cypress Hilltop Picnic Area access road improvements. Located along the margins and in shallow areas of the sloughs and Chivos pond, these areas are dominated primarily by native, emergent hydrophytic plants and provide valuable refugia and breeding habitat for CRLF and avian species, including migratory shorebirds and waterfowl. The methods used to delineate jurisdictional wetlands and "waters" were based on the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008). These areas were determined to have evidence of hydrophytic vegetation, wetland hydrology, and hydric soils as required by USACE delineation guidelines and are likely subject to jurisdiction under Section 404 of the CWA by the ACOE.

Waters of the State of California

No additional areas exclusively classified as Waters of the State, including isolated wetlands lacking a significant nexus with Traditional Navigable Waters (TNWs), were identified within the Study Area. All existing wetlands and waterways are presumed to be jurisdictional under Section 404 of the Clean Water Act.

Coastal Act Wetlands

No one or two parameter Coastal Act *seasonal* wetlands were determined to occur within the Study Area. Several areas were dominated by poison hemlock, Italian ryegrass, and curly dock, all of which are classified as facultative (FAC) weedy grasses and forbs. However, co-dominant plants are lacking (i.e., monospecific poison hemlock stands) or classified as upland (UPL) species in these areas, and no direct or indirect evidence of wetland development including contemporary wetland hydrology and hydric soils were observed. In many instances, poison hemlock is situated on moderate to steep embankments in well drained, loamy (non-hydric) soils, with no evidence of past or contemporary wetland hydrology.

All areas dominated by willows (FACW) are considered wetlands under the Coastal Act and Santa Cruz County LCP. However, many of these areas do not meet hydric soil or wetland hydrology criteria as they are located on hillslopes or embankments above the OHWM of the Watsonville Sloughs and Chivos Pond. Nevertheless, these areas are regulated as wetlands under the County of Santa Cruz LCP and direct impacts or encroachment less than 100 feet would require a Wetland and Riparian Exception Permit from the County of Santa Cruz.

Santa Cruz Tarplant Critical Habitat

In 2002, the USFWS designated 2,902 acres of Critical Habitat for federally threatened Santa Cruz tarplant in Contra Costa and Santa Cruz Counties. This included 17 extant occurrences as well as areas that provide suitable habitat conditions including clay soils, mesic hydrologic regime (seasonally saturated soils), pollinators, and complimentary plant communities (grassland and patch coastal scrub).

A total of 91.7 acres of Santa Cruz tarplant critical habitat is located within the Community Harvest Study Area. Of this, approximately 0.87 acres will be permanently impacted by new trail segments and other Community Harvest Program elements. While it is not expected that Santa Cruz tarplant would be impacted by the project, voluntary restoration of Santa Cruz tarplant could occur in coordination with Watsonville Wetlands Watch, CDFW, USFWS, or other academic or research institutions with permits to collect and propagate tarplant seed and provide seedlings for outplanting. Details regarding potential tarplant restoration will be included in the Conceptual Mitigation Plan for the Program.

6.4 SIGNIFICANT TREES

The Study Area and Project Area is located within the Coastal Zone and the jurisdiction of the County of Santa Cruz and any “significant trees” within this portion of the Community Harvest access improvements would be subject to the County Significant Trees Protection Ordinance. Because the Program Area is located beyond the Urban and Rural Services Line, Significant Trees are limited to individuals with a single trunk larger than 40-inches DBH, trees with five or more stems each of which is greater than 20-inches DBH, or any group of ten or more trees on one parcel where each is greater than 20-inches DBH.

Presently, several trees meeting these criteria may be trimmed to accommodate various aspects of the project. One large Monterey cypress located on the top the grassy knoll at the Cypress Hilltop Picnic Area, and several significant-sized eucalyptus trees and one deodar cedar near the caretaker facility west of Chivos Pond require encroachment into the root zone to accommodate various aspects of the project. Although planned for preservation, if removed these trees would be replaced at a ratio and species composition determined in coordination with the County of Santa Cruz Planning Department Environmental Coordinator. It is expected the replacement ratio will be a minimum 3:1 (planted:removed) and native species common to the area will be selected for replanting including Coast live oak, black cottonwood, or Pacific willow.

6.5 SPECIAL-STATUS WILDLIFE

The proposed Community Harvest Program Area and Study Area support or have potential to support the following sensitive wildlife species. During our 2021 field surveys, we observed the following special-status wildlife species:

- western pond turtle (*Emys marmorata = Actinemys pallida)*,
- California red-legged frog (CRLF) (*Rana draytonii*),
- bald eagle (*Haliaeetus leucocephalus),*
- northern harrier (*Circus hudsonius*),
- white-tailed kite (*Elanus leucurus*),
- oak titmouse (*Baeolophus inornatus*).
- Lawrence's goldfinch (*Spinus lawrencei), and*
- San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*).

The following sensitive wildlife species are known to occur in or near the Study Area:

- golden eagle (*Aquila chrysaetos*),
- American peregrine falcon *(Falco peregrinus anatum)*, and
- western burrowing owl (*Athene cunicularia*) (migrants or wintering).

The following species has the potential to occur based on the presence of available suitable habitat and known occurrences in the vicinity:

- olive-sided flycatcher (*Contopus cooperi*),
- yellow warbler (*Setophaga petechia*), and
- grasshopper sparrow (*Ammodramus savannarum*).

The following avian species is known from the vicinity of the Study Area outside of their breeding seasons (and has not been known to breed in the area since 2008):

- tricolored blackbird (nesting colony) (*Agelaius tricolor*).

Common avian species utilize the Study Area for nesting. Both sensitive and common bat species may utilize the buildings and trees within the Study Area for roosting, and forage over the sloughs.

Amphibians and Reptiles

The California red-legged frog was observed during 2021 field surveys and has been documented within the Study Area. These results are summarized below. Long-toed salamander and California tiger salamander are not expected to occur within the Study Area based on lack of suitable habitat, distances to known occurrence locations, and intervening barriers to movement.

California Red-legged Frog. The CRLF is listed as Threatened under the federal Endangered Species Act (USFWS 1996) and is a California Species of Special Concern (Thompsom et al. 2016, CNDDB 2023). The CRLF may use a variety of habitat types, including aquatic, riparian, and upland habitats. Breeding habitat includes ponds, slow-flowing stream reaches (including lagoons and marshes) and off-channel pools, deep pools in streams with vegetation such as bulrush (*Schoenoplectus californica)* and cattail (*Typha* sp.), or other substrates for egg mass attachment of sufficient duration (mid- to late summer) that tadpoles can complete metamorphosis. The CRLF also occurs in human environments such as stock ponds, sewage treatment ponds, wells, canals, golf course ponds, irrigation ponds, sand

and gravel pits (containing water), and large reservoirs (Jennings 1988). Introduced predators (centrarchid fish, crayfish, and bullfrogs (*Rana catesbeiana*) limit or preclude the occurrence of CRLF over time.

Riparian, upland, and dispersal habitats that are contiguous with breeding and non-breeding aquatic habitats and free of barriers serve to connect aquatic habitats within 1 mile (1.6 km) of one another (USFWS 2010).

Individuals may live in a single habitat type for their entire life, given sufficient and varied food, shelter and cover, to meet differing habitat requirements for all life stages; however, CRLF often move between breeding and non-breeding habitats. Varied landscapes consisting of aquatic, riparian, and upland habitats in close proximity to one another allow individuals to disperse based on environmental conditions (USFWS 2002).

The CRLF breeds from November to April with mating most commonly occurring in February or March locally, after the onset of rain. Eggs masses are deposited near the surface of the water attached to emergent vegetation, such as bulrushes (*Schoenoplectus* spp.), cattails (*Typha* spp.), roots or twigs, usually from 3-8 inches deep (Storer 1925). In lentic environments, egg masses have been observed unattached or loosely attached to floating mats of vegetation (Reis 1999). Eggs hatch and mature into tadpoles after 20 to 22 days, then develop into frogs after 11 to 20 weeks, usually between July and September and sometimes overwintering to metamorphose the following March or April (USFWS 2002).

CRLF subadults and adults are known to disperse overland up to 2 miles (3.2 km) between breeding and aquatic sites to forage and/or breed (Bulger et al. 2003; USFWS 2002). Transient frogs have been observed in a variety of upland areas considered unsuitable for frogs such as open grasslands, croplands, and roads (USFWS 2002 and 2006). They have also been observed in environments providing more refuge opportunities: dense thickets of shrub-like vegetation, leaf litter, slash/debris piles, stockpiled boulders/rip-rap (Rathbun et al. 1993, Jennings and Hayes 1994; USFWS 2006).

The CRLF is active year-round along the California coast, but will aestivate from late summer to early winter in small mammal and rodent burrows, as well as in cracks and crevices in the ground, especially if their associated aquatic habitat becomes dry (Jennings and Hayes 1994).

The Land Trust has partnered with the Resource Conservation District of Santa Cruz County and Watsonville Wetlands Watch to create and restore wetlands for the benefit of CRLF and species with similar habitat requirements. These features are described as restoration wetlands below.

The California red-legged frog was observed during 2021 field surveys and has been documented in the frog pond and restoration wetlands on the south side of WSF (where breeding is known to occur) (LTSCC 2023; Kittleson 2023; CNDDB 2023a,b). **Figure 4** depicts recent known breeding locations in the immediate vicinity. Breeding has also been documented in the agricultural ditches along the rail line just south of WSF and in the restored channel at the confluence of Watsonville Slough and Harkins Slough, also south of WSF (**Figure 4**) (Kittleson 2023). The sloughs within the Study Area support non-native predators: Louisiana crayfish (*Procambarus clarkii*), American bullfrog, common carp (*Cyprinus carpio*), bullheads (*Ameiurus sp*), mosquitofish (*Gambusia affinis*), sunfishes (*Lepomis sp*), and largemouth bass (*Micropterus salmoides*) as well as native avian CRLF predators. Numerous bullfrogs and non-native fish were observed during our field surveys. These non-native species limit CRLF presence in the sloughs. Habitats that dry down annually deter bullfrogs (bullfrog tadpoles take two years to undergo metamorphosis) and preclude non-native fish.


Figure 4.
Known CRLF Occurrences in or near the Watsonville Slough Farm Community Harvest Program Study Area
Legend
Acoustic Monitoring 2020 - Calling Detected
Acoustic Monitoring 2020 - No Calling Detected
CNDDB
Critical Habitat
Egg Masses 2020
Egg Masses 2021
Harkins Slough Rd
1999-2006
2001
Kingfisher Ln
Chivos Pond
West Branch Struve Slough
Paseo Dr
1990
1999-2006
Harkin's Slough
Hanson's Slough
Struve Slough
1999-2006
1999
channelized Watsonville Slough
2007-2015
Lee Rd
Google Earth
© 2021 Google
3000 ft
N

Within the Study Area, CRLF are likely to utilize riparian, wetland, and upland habitats (oak woodland, coastal scrub, grasslands, and agricultural fields) for movement, dispersal, and refuge. These habitats are contiguous with aquatic habitats occupied by CRLF.

Western Pond Turtle. The western pond turtle (*Emys marmorata*) is a CDFW Species of Special Concern (CDFW 2023c, Thompson et al. 2016). The western pond turtle (WPT) is found in ponds, marshes, rivers, streams, and irrigation ditches containing aquatic vegetation. This species is usually observed sunning on logs, banks, or rocks. The WPT moves up to 3-4 miles, especially during "walk-abouts" before a female lays eggs (mid-May through early September), within creek (or slough) systems and sometimes overland, even into urban and suburban areas. The female typically nests up to several hundred feet from aquatic habitat, in open woodlands, open forest, or grasslands, typically with low-growing vegetation or bare soil on south- or west-facing slopes where there is adequate sun exposure (Holland and Bury 1998). A WPT carcass was found by proposed Boardwalk/Fish Screen A during 2021 surveys. In 2019 an individual gravid female was found on Main Street near Struve Slough and was relocated back into Struve Slough near Lee Road, with suitable nesting habitat nearby (Reis 2020). This species is known to occur in Struve Slough although recent CNDDB records are scarce (CNDDB 2023a,b). The Study Area provides abundant suitable aquatic and nesting habitat; however, numerous bullfrogs and centrachid fish, which predate on eggs and young turtles, are likely to limit successful reproduction of the WPT.

Avian Species

During our 2019, 2020, and 2021 surveys, we observed several special-status bird species within the Study Area: bald eagle, northern harrier, white-tailed kite and Lawrence's goldfinch. Several additional special-status bird species were listed as 'Present' or 'Possible": golden eagle, American peregrine falcon, western burrowing owl (migrants or wintering), oak titmouse, olive-sided flycatcher, yellow warbler, grasshopper sparrow, and tricolored blackbird (**Appendix B**). Although we did not observe these species during surveys, they are known to occur in the vicinity, and the Study Area provides potential nesting habitat (or potential foraging/wintering habitat) (CNDDB 2020a,b; ebird 2020). These special-status species may utilize the Study Area and are described in more detail below.

All nesting birds of prey (i.e., hawks and owls), other native nesting birds and their occupied nests, and individual birds of prey and passerine birds are protected by the federal MBTA and by California Fish and Game Commission Code (CFGC) (§ 3503 and 3503.5). Special-status bird species receive additional protections, primarily for nesting activities, with some species (such as Fully Protected species) receiving additional protection for wintering and foraging activities. Suitable potential nesting habitat for special-status birds, raptors, and other common avian species is present within the Study Area.

Bald Eagle. The bald eagle is state listed as Endangered and is listed as Fully Protected by CDFW (CDFW CNDDB 2023); both nesting and wintering activities are protected. The bald typically breeds in forested areas adjacent to large bodies of water. Nests sites are in mature trees with some habitat edge, relatively close (usually <2 km) to water with suitable foraging opportunities (diversity, abundance, and vulnerability of prey base). For perching, the bald eagle prefers tall, mature coniferous or deciduous trees with a wide view of the surroundings.

The bald eagle is known to nest west of the Study Area along Gallighan Slough, was observed during field surveys and has been observed there in 2023 (Pers. Obs. 2020; ebird 2023). The bald eagle may forage over the sloughs and grasslands within the Study Area. Offspring may nest within tall trees in the Study Area and vicinity.

Golden Eagle. The golden eagle is listed by the CDFW as Fully Protected (CDFW CNDDB 2023). In central California the golden eagle typically hunts over grasslands with high topographic relief (rolling hills and mountains) building nests in cliffs or trees, often in oak woodland or oak savanna with a wide view of the surrounding area, updrafts for flight, and proximity to small to medium sized mammal hunting grounds (Katzner et al. 2020).

Golden eagles, including juvenile birds, have been documented in and near the Study Area during breeding season (ebird 2023). The tall trees within WSF provide potential nesting habitat, especially those on knolls and ridges.

Northern Harrier. The nesting activities of the northern harrier are protected as a CDFW Species of Special Concern (CDFW 2023c, Shuford and Gardali 2008). The northern harrier hunts over open wetlands, marshes, grasslands, pastures, and active and fallow agriculture fields. Its diet consists of rodents and other small to medium-sized mammals, birds, insects, reptiles, amphibians and carrion (Smith et al. 2020). The harrier nests in treeless habitats, building a loose nest composed of grasses, forbs, weeds, and wetland plants, on the ground or in thick vegetation near the ground in a well-concealed location, often near creeks or stock ponds. Females brood, raise, and defend the young without the males. However, male and female northern harriers will roost communally (on the ground) during the non-breeding season (Smith et al. 2011).

The northern harrier was observed during our field surveys and numerous ebird records document the northern harrier in the Study Area (eBird 2023). The grasslands of the Study Area provide foraging and potential nesting habitat.

White-tailed Kite. The white-tailed kite is listed by the CDFW as Fully Protected (CDFW CNDDB 2023). The white-tailed kite inhabits agricultural fields, open grasslands, savannah-like habitats, and riparian and oak woodlands in a relatively narrow band on the west coast of the U.S. and Canada and over large parts of Mexico. An abundance of prey is a requisite habitat feature. The white-tailed kite feeds on rodents, lizards, birds, and insects. Nests sites are variable and may be located in herbaceous open stages of most habitats, from large scrub to trees. The kite makes a stick nest near the top of its nest site, camouflaged from below but open on top. Some nest site fidelity has been observed. Kites may nest semi-colonially. Breeding season occurs from late February to early August. Occasionally kites will double brood in a single season (Dunk 1995, Laursen 2018).

We observed the white-tailed kite during our 2019 and 2021 surveys foraging over the Study Area and Struve Slough, and perching in a snag adjacent to Chivos Pond. Trees and larger scrub habitat within the Study Area provide potential nesting habitat for the white-tailed kite. The kite is likely to hunt over the grasslands, agricultural fields, and sloughs. Numerous eBird (2023) records document the kite on WSF.

American Peregrine Falcon. The peregrine falcon is listed by the CDFW as Fully Protected (CDFW CNDDB 2023) and by USFWS as a Bird of Conservation Concern (USFWS 2021). The peregrine falcon inhabits a variety of habitats with open landscapes for hunting, typically utilizing cliffs open to the air as nest sites but also occupying the abandoned nests of other large birds. This species has been observed on WSF (ebird 2023); the steeper embankments along Harkins and Gallighan Sloughs may provide nesting habitat. The observed individuals are likely hunting for the numerous bird species present within WSF.

Burrowing Owl. The western burrowing owl is a USFWS (2021) Bird of Conservation Concern and a CDFW Species of Special Concern (CDFW 2023c, Shuford and Gardali 2008). Breeding sites are protected as well as some wintering sites, typically in more northern colder areas (CDFW CNDDB 2023). The burrowing owl is found in open areas with sparse, low-growing vegetation (<6 inches around burrows) including annual

and perennial grasslands, deserts, open scrub habitats, and agricultural fields with suitable burrows. Burrows of fossorial mammals are an essential component of their nesting and wintering habitat, but they may also use artificial structures such as culverts, openings in asphalt pavement, woody debris/rock piles, and crevices in stacks of straw bales (Poulin et al. 2020). The presence of fossorial mammals, typically ground squirrels, is a good predictor for re-occupancy of habitat, typically in areas that are adjacent to current breeding habitat (Center for Biological Diversity et al. 2003; Shuford and Gardali 2008).

This species was observed as a winter migrant in 2021 on the southeast corner of WSF and wintering on the grasslands associated with Pajaro Valley High School (PVHS) in 2018, as a winter migrant at PVHS in December 2019 and at the Watsonville Airport in March 2018 (ebird 2023). Suitable wintering habitat is present in the grassland habitats of WSF, especially the restored native grassland; however, contiguous grassland on WSF is limited by the surrounding agricultural fields and may not provide sufficient area for wintering (Rinkert 2020).

Breeding burrowing owls are extirpated from Santa Cruz County (Center for Biological Diversity (CBD) et al. 2003; Townsend and Lenihan 2007; Trulio 2018); the last known occurrence of breeding in Santa Cruz County is from 1987 at the University of California, Santa Cruz (UCSC) (CBD et al. 2003; Santa Cruz Bird Club 2013). The closest breeding sites are from Santa Clara County, where year-round resident burrowing owls are present, and (likely) San Benito County. These individuals typically winter within 1 mile of breeding sites and show site fidelity during subsequent breeding seasons. During recent (2016 - 2018) studies of historical breeding locations, no new breeding locations were identified in the vicinity (Trulio et al. 2018). Re-establishing breeding in extirpated areas is considered very difficult. Re-establishment efforts primarily focus on suitable areas adjacent to or near current breeding habitat (Trulio 2018).

Migrants from British Columbia, Washington state, and Oregon come to California to winter, utilize current and historic breeding sites as wintering locations, appear to demonstrate some wintering site fidelity, but leave in the late winter/early spring prior to breeding (Trulio et al. 2018). This species is not expected to breed within WSF (Center for Biological Diversity (CBD) et al. 2003; Townsend and Lenihan 2007; Trulio 2018; Rinkert 2020) but may winter within or adjacent to the Study Area (November -March) or occur as a winter migrant.

Olive-sided Flycatcher. The nesting olive-sided flycatcher is listed as a Bird of Conservation Concern by USFWS (2021) and a CDFW Species of Special Concern (CDFW 2023c, Shuford and Gardali 2008). Inhabits woodland and forest habitats. The olive-sided flycatcher nests in tall trees, generally near the edges and openings to meadows, grasslands, wetlands, and ponds (Altman and Sallabanks 2012). The oak woodland, arborescent riparian, and ornamental trees within the Study Area provide potential habitat. We did not observe this species during our surveys and the closest breeding season records are from the Pajaro River (ebird 2023).

Grasshopper Sparrow. The nesting grasshopper sparrow (*Ammodramus savannarum)* is a CDFW Species of Special Concern (CDFW 2023c, Shuford and Gardali 2008). The California breeding range for grasshopper sparrow (*Ammodramus savannarum)* is a very narrow band along the coast. The grasshopper sparrow is associated with short to medium-height grasslands, often with patchy bare ground, and may be found in pastures and agricultural fields. In the west, this species utilizes lusher grasslands with shrub cover. The grasshopper sparrow nests on the ground in grassland habitats between April and June and forages on insects and seeds (Vickery 1996).

We did not observe the grasshopper sparrow during our surveys and records are rare in the vicinity; however, the non-native and native grasslands of the Study Area provide potential nesting habitat. Local observations are from 2022 at the Buena Vista Landfill, along upper West Branch Struve Slough, in the CDFW Reserve (August 2018 and September 2020), and north of Pajaro Valley High School (May 2014);

and from the Harkins Slough and Watsonville Slough confluence (May 2013). Breeding season records are more common further inland in the open space lands east of Watsonville such as the Kelly Thompson Ranch (eBird 2023).

Yellow Warbler. The nesting yellow warbler is listed as a CDFW Species of Special Concern (CDFW 2023c, Shuford and Gardali 2008). The yellow warbler forages in dense riparian understory and nests in riparian woodland with an open canopy along streams or other watercourses. This species has been observed within the Study Area during nesting season (2019-2021) and has been documented breeding along the Pajaro River as recently as 2022 (ebird 2023). The riparian forest within the Study Area provides potential nesting habitat.

Tricolored Blackbird. The nesting colonies of the tricolored blackbird are listed as Threatened under the California Endangered Species Act (CESA) (CDFW 2023b) and this species is a USFWS Bird of Conservation Concern (2021). The tricolored blackbird has a very limited geographic range and is nearly restricted to California (Meese and Beedy 2015). This species forms the largest breeding colonies of any North American landbird. Breeding sites require open accessible water; suitable protected nesting substrate, such as spiny, thorny or flooded vegetation; and open-range foraging habitat providing adequate insect prey within a few kilometers, such as natural grassland, shrubland/woodland, or agricultural cropland (Meese and Beedy 2015, Beedy et al. 2017). Breeding colonies are found in a variety of substrates including freshwater marshes dominated by cattail (*Typha latifolia*), bulrush (*Schoenoplectus californicus*), and on the central coast, Himalayan blackberry (*Rubus armeniacus*). Successful reproduction is positively associated with insect abundance in surrounding foraging habitat. Wintering tricolored blackbirds also congregate in flocks of mixed species blackbirds that forage in grasslands and agricultural fields. In February, this species separates into pure tricolored blackbirds flocks that roam and forage until they find a suitable nesting colony location.

The tricolored blackbird is known from the Study Area in Hanson's Slough and Struve Slough and nearby from the CDFW Reserve (CNDDB 2023a,b) and Harkins Slough (ebird 2023). Occurrence records are from outside of breeding season; this species has not been observed breeding in Santa Cruz County since 2008 (Meese 2017). In March 2017, a flock of 150 birds was observed briefly in Harkins Slough; this flock was likely roaming and foraging before selecting a breeding location. The statewide tricolored blackbird breeding surveys have been conducted triennially since 1994 to monitoring this species' numbers. The breeding population on the Central Coast declined by 91% between 2008 and 2014 (Meese 2014); however the 2017 survey showed an increase in birds along the Central Coast due primarily to three colonies: a new 7,500 bird colony in the Panoche Valley of San Benito County, a location that was not surveyed previously; a 3,000 bird colony in Alameda County where fewer than 100 birds had been observed on previous statewide surveys, and a 2,500 bird colony in Monterey County in a previously unknown location (Meese 2017). Recovery has not been observed in other areas. It is unlikely that this species would breed within or near the Study Area within the next few years; however, if the number of tricolored blackbirds breeding on the Central Coast continues to increase, this species may breed in or near the Study Area in the future.

Lawrence's Goldfinch. The Lawrence's goldfinch is listed as a Bird of Conservation Concern by the USFWS (2021). The Lawrence's goldfinch typically occupies arid and open woodlands in the near vicinity of three habitat components: chaparral or other brushy areas; tall annual weed fields; and water source such as stream, small lake, or farm pond. It prefers native plant seeds as a food source, and breeding sites are typically close to water. On the Central Coast, the Lawrence's goldfinch tends to nest in oaks of moderate to small diameter with some lichen; however, this species may use riparian woodland, chaparral, or coastal scrub (Watt et al. 2016; Rosenberg et al. 1991).

We observed individual Lawrence's goldfinches during 2019 and 2021 surveys perching on the fenceline and foraging along Lee Road over the grassland and coastal scrub habitats of the Study Area and the CDFW Reserve. The Study Area provides potential nesting habitat within the oak woodland and riparian habitats; however, nesting on the central coast is erratic. This species was also documented in 2019 near the confluence of Watsonville Slough and Harkins Slough (ebird 2023) and we observed an individual in the grassland terrace north of the Buena Vista Landfill in 2018.

Oak Titmouse. The oak titmouse is listed as a 'Bird of Conservation Concern' by the U.S Fish and Wildlife Service (2021). The oak titmouse inhabits open oak woodlands and pine-oak woodlands with an intermediate canopy cover, but has adapted to locally warm, dry environments without oaks.

The oak titmouse is dependent on dead trees and/or limbs with natural cavities for nesting. They are also known to nest in old woodpecker cavities and/or utilize manmade nest boxes. Females collect nesting material of grass, moss, feathers, shredded bark and other materials, mostly from mid-March through April. After eggs are laid, young birds typically fledge after approximately one month.

Within the Study Area, trees with cavities and hollows, including the oak woodland and ornamental trees and posts with cavities provide potential nesting habitat for the oak titmouse. We observed the oak titmouse during our 2021 surveys, and recent (2023) LTSCC and ebird records document this species' presence in the Study Area.

Other Nesting Avian Species. Numerous common avian species (**Appendix E**) including raptors and non-raptors are likely to nest within the grassland, scrub, woodland, riparian, wetland, and slough habitats of the WSF Study Area. Great horned owl, barn owl, osprey, Cooper's hawk, and nesting red-tailed hawks with young were observed during field surveys. A comprehensive breeding bird survey was not conducted because nest sites for most avian species are dynamic, and nest locations vary from year to year; however, incidental observations are noted in **Appendix E**. Those species that are not identified as wintering species are likely to breed within the Study Area. Additional common bird species are listed as occurring in ebird (2023).

Mammals

The California Fish and Game Codes (CFGC) protect non-listed bat species and their roosting habitat, including individual roosts and maternity colonies. These include CFGC Section 86; 2000; 2014; 3007; 4150, along with several sections under Title 14 of California Code of Regulations (CCR).

Bat Species. The sensitive foliage roosting bat species, western red bat, a CDFW Species of Special Concern (CDFW 2023c) may occur within the riparian forest of the Study Area. This species is a foliage roosting bat that prefers intact riparian habitat. Roost sites are generally hidden from view from all directions except below; lack obstruction beneath, allowing the bat to drop downward for flight. They typically use roost sites that are protected by nearby vegetation to reduce wind and dust; and are generally located on the south or southwest side of a tree. Day roosts are commonly in edge habitats adjacent to streams or open fields. The western red bat is typically a solitary rooster and is highly migratory (WBWG 2017).

The common bat species, hoary bat (a foliage roosting bat), Mexican free-tail bat, and silver-haired bat were detected during the acoustic/emergence survey of the steel barn. Other sensitive and common bat species may occur in the buildings, oak woodland, riparian and ornamental tree habitats of the Study Area. The CFGC protects non-listed bat species and their roosting habitat, including individual roosts and

maternity colonies (§ 86, 2000, 2014, 3007, and 4150) along with several sections under Title 14 of the CCR. The typical breeding season for bats is from May to September.

San Francisco Dusky-footed Woodrat. The San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) is considered a CDFW Species of Special Concern (CDFW 2023c). The woodrat is associated with riparian, oak woodland, and scrub habitats, especially near edge habitats. The woodrat builds houses on the ground or in trees, utilizing understory, woody debris, human debris, structures or buildings. Houses range in size from 3 to 8 feet across at the base, up to 6 feet tall, and up to approximately 30 feet above the ground in tree canopies. The woodrat tends to live in colonies of 3 to 15 or more houses, with the inhabitants often representing multiple generations. Houses have food caches, latrines, and often *Peromyscus* sp. nests and/or amphibians within. The woodrat is mostly nocturnal, leaving its house to forage on different parts of the same woody plant seasonally including leaves, bark, seeds and fruit of coast live oak, coffeeberry, poison oak, elderberry, but also grasses, flowers, and fungi. The woodrat breeds from December to September with a peak in mid-spring (Sakai and Noon 1993).

Within the Study Area, the coastal scrub, mixed riparian, and oak woodland provide suitable habitat for the woodrat. Woodrat houses were observed in the riparian forest along the southern boundary of WSF.

6.6 WILDLIFE MOVEMENT

Providing functional habitat connectivity between natural areas is essential to sustaining healthy wildlife populations, allowing for the continued dispersal of native plant and animal species and for genetic biodiversity, and is considered under the California Environmental Quality Act (CEQA).

Corridors for wildlife movement (also dispersal corridors, wildlife corridors, or landscape linkages) are features whose primary function is to connect at least two isolated habitat areas (Bond 2003). A basic description of the functions of corridors is as follows:

> *Corridors provide avenues along which (1) wide ranging animals can travel, migrate, and meet mates…(2) plants can propagate…(3) genetic interchange can occur…(4) populations can respond to environmental change…[and] (5) locally extirpated populations can be replaced from other areas (Beier and Loe 1992).*

In the interface between open spaces and agriculture, corridors can provide links between different habitat areas. In the vicinity of the Study Area, open spaces lack the requisite structural or spatial heterogeneity to be considered core habitat, but may provide relictual or small areas of native habitats, as well as opportunities for wildlife. These areas are considered habitat patches or supportive natural landscapes. The larger sloughs and the surrounding uplands, including the restored areas of WSF and the CDFW Reserve would be considered habitat patches in that they are surrounded by development and agricultural areas, without adequate connectivity to other larger more intact open spaces in the vicinity and region. The tree stands, coastal scrub, riparian areas, and marshes adjacent to the open waters of the sloughs provide cover, shelter, roosting, and nesting habitats for wildlife species that may utilize the slough system.

Creeks, drainages, and associated riparian habitats would be considered linear habitats. Linear habitats in agricultural or developed landscapes provide habitat for native plants, canopy cover, opportunities for foraging, refuge from predators, as well as the opportunity to disperse (Beier and Loe 1992). The smaller fingers of the sloughs and their associated riparian habitats would be considered linear habitats.

Marginal connectivity exists between the sloughs and Ellicott Reserve to the north through drainages, hedgerows, and the somewhat permeable barrier provided by agricultural fields. Agricultural fields

provide the only semi-permeable links that allow movement from the sloughs to the Pajaro River, Corralitos Creek, or the larger open spaces in Freedom and Corralitos.

Lee Road, east of the Study Area would be considered a barrier to wildlife movement; however, this section of Lee Road dead ends at Struve Slough and traffic is currently primarily limited to vehicles accessing Watsonville Slough Farm and Fitz Fresh Mushrooms Farm, which receive less business during nighttime hours, when wildlife are more likely to move. Therefore, Lee Road is somewhat permeable to wildlife movement.

Wildlife that are moving through the Study Area and surroundings are likely to use the sloughs and their riparian habitat as linear corridors because of the shelter, cover, food and water resources these areas provide; however, some species are likely to cross Lee Road, to move between the CDFW Reserve, Chivos Pond and Hanson Slough. These species include bobcat, coyote, deer, skunks, raccoons, and rabbits. In addition, the CRLF and other amphibians are known to move directly between aquatic resources, across upland habitats, intervening roads, ruderal areas and agricultural fields.

7.0 POTENTIAL IMPACTS/AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

The proposed Community Harvest Program has been designed to minimize impacts to biological resources. The new trail segments would connect with existing farm roads and mowed access trails and boardwalk crossings are designed where existing crossings were positioned when the water level in the sloughs was lower due to historic drainage for agricultural activities in the region.

Below we have assessed potential impacts of the proposed project to biological resources and identified avoidance, minimization, and mitigation measures to reduce potential impacts to less than significant. Additional measures may be required by agency representatives, including USFWS, USACE, the Regional Board, CDFW, the County of Santa Cruz, and the California Coastal Commission.

7.1 SENSITIVE PLANT AND WILDLIFE SPECIES

Would the project:

	Potentially Significant	Less Than Significant with Mitigation	Less Than Significant	No Impact
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 Wildlife, or U.S. Fish and Wildlife Service?	☐	☒	☐	☐

Botany

No sensitive plant species were identified within the Study Area, nor are they expected to occur. No impacts to sensitive plant species are anticipated to result from the proposed Project. Minor impacts to non-native grassland within the Study Area are not considered a significant impact to Santa Cruz tarplant Critical Habitat and compensatory mitigation is not recommend. The LTSCC may choose to actively establish SC tarplant within restored native grasslands on the WSF property. For this effort, permits for seed collection, propagation, and outplanting would be required from CDFW and USFWS. We suggest coordinating with Watsonville Wetlands Watch, UCSC, the Santa Cruz RCD, native plant nurseries, or other reputable organizations and academic institutions. We also recommend the following Best Management Practices (BMPs) to further reduce impacts to native vegetation.

- Minimize removal or disturbance of existing vegetation outside of the footprint of project construction activities. To the maximum extent feasible, confine project activities and operation of equipment and vehicles, including site access and parking, to designated staging areas.
- Prior to staging equipment on-site, clean all equipment caked with mud, soils, or debris from off-site sources or previous project sites to avoid introducing or spreading invasive exotic plant species. When feasible, remove invasive exotic plants from the Project Area.

Wildlife

The following sensitive wildlife species are present or have potential to occur within the Study Area:

- California red-legged frog (CRLF) (*Rana draytonii*),
- western pond turtle (*Emys marmorata = Actinemys pallida)*,
- bald eagle (*Haliaeetus leucocephalus),*
- golden eagle (*Aquila chrysaetos*),
- northern harrier (*Circus hudsonius*),
- white-tailed kite (*Elanus leucurus*),
- American peregrine falcon *(Falco peregrinus anatum)*,
- western burrowing owl (*Athene cunicularia*) (migrants or wintering), and
- oak titmouse (nesting) (*Baeolophus inornatus*),
- olive-sided flycatcher (nesting) (*Contopus cooperi*),
- yellow warbler (nesting) (*Setophaga petechia*),
- grasshopper sparrow (nesting) (*Ammodramus savannarum*),
- western red bat (*Lassiurus blossevillii*), and
- San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*).

Birds of prey, other common bird species, and common bat species are likely to utilize the Study Area for breeding and roosting, respectively. An overview of these species has been provided in the sections above, and potential project-related impacts are described below. Avoidance, minimization, and mitigation measures are identified for the protection of these species and/or their habitat and are listed below. These measures will reduce project-related impacts to less-than-significant.

California Red-legged Frog. The CRLF is listed as threatened under the federal Endangered Species Act (USFWS 1996) and is a California Species of Special Concern (Thompson et al. 2016, CDFW 2023c). The CRLF is known to utilize the aquatic habitats within the Study Area and may utilize the adjacent riparian and upland habitats for refuge, movement, and/or dispersal. The proposed Program is located within Critical Habitat for CRLF (USFWS 2010).

To avoid unlawful "take" of CRLF, during project permitting under Section 404 of the Clean Water Act, it is anticipated that the Corps will initiate formal consultation with USFWS. This biotic assessment will be provided to USFWS at that time. We anticipate that USFWS will generate a Biological Opinion (BO) for the project under Section 7 of the Endangered Species Act; or utilize the programmatic BO between the Corps and USFWS, if the project meets the criteria for this permitting mechanism. The BO will describe protective measures and conditions for the Project, including the conditions for a USFWS-approved biologist to handle and relocate CRLF that move into the Work Areas. With the approval of USFWS, the biologist will identify relocation sites for CRLF. The Biological Opinion will also address Program operation and associated potential impacts.

IMPACT BIO-1A: The Program could result in adverse effects to CRLF during construction and operation.

The proposed Program may result in temporary impacts to CRLF during the construction of the two boardwalks across Hanson Slough, three observation platforms along Harkins Slough and at the confluence of Hanson and Struve Slough, and limited natural surface trail segments. Impacts may occur during grubbing and vegetation removal, grading, work within and adjacent to the sloughs, and equipment and vehicle access and operation.

Work occurring directly in CRLF habitat may temporarily reduce available CRLF habitat, although recent documented CRLF breeding habitat is located in the southernmost portion of the Study Area where no Program amenities are proposed and impacts to potential non-breeding aquatic and upland habitat would be very minimal in locations proposed for Program amenities.

Work occurring directly in Hanson Slough (Boardwalks A and B), adjacent to Harkins Slough and adjacent to the confluence of Hanson and Struve Slough (Observation Platforms 1-3) may result in direct take of CRLF or temporarily disrupt potential CRLF in the sloughs through increased noise levels, vibrational, and visual disturbances, and barriers to movement. Construction activities within the sloughs would occur during the dry season, when the water level is lowest. In addition, construction activities may temporarily degrade potential CRLF habitat in and adjacent to the construction footprint through the introduction of sediment and potential unanticipated releases of equipment fuel, hydraulic fluid, or other potentially hazardous substances used in construction equipment; and through vegetation removal, grubbing, and disturbance in aquatic, upland and dispersal habitats.

CRLF may move through upland work areas during construction. Construction equipment, grading, and earth moving could cause direct injury or mortality to CRLF, as well as harassment though increased noise levels, vibrational, and visual disturbances, and barriers to movement and dispersal.

During construction, erosion and sediment control measures to reduce sediment and chemical-laden runoff introductions would reduce potential impacts to CRLF and habitat to less-than-significant.

The proposed Program would introduce an increase in pedestrian use of WSF. Increased presence of Program participants may result in increased harassment, injury, and mortality of CRLF through trampling, and interference with CRLF movement, dispersal, and other life events. The increased human presence may degrade CRLF habitat through trampling, compaction of small mammal burrows, alteration of the native vegetation, increased trash, and pollution of aquatic habitat; however, visitor access would be regulated. On-going maintenance activities around Program amenities, such as mowing, pruning, and trail repair could also result in direct impacts to CRLF and Critical Habitat.

Implementation of the following CRLF protection measures will reduce potential impacts to less-than-significant:

- During project construction activities, employ avoidance measures, including biological monitoring for California red-legged frog (CRLF) and other sensitive wildlife species:
    - Prior to initiation of construction activities, a USFWS- and CDFW-approved biologist shall identify areas to be protected with exclusion fencing, and all areas requiring monitoring by a USFWS- and CDFW-approved biologist.
    - Prior to initiation of construction activities, a USFWS-approved biologist shall conduct an environmental training for all construction personnel. The training shall include a description of CRLF and its habitat, and measures to protect CRLF, and other sensitive wildlife species known or with potential to occur (WPT, nesting avian species, SF dusky-footed woodrat, and roosting bats) in the Study Area.
    - Prior to initiation of construction activities, the construction contractor shall install exclusion fencing (solid silt fencing) in specified areas along the work area boundaries, 6 inches inches below grade and 3.0 feet above grade, with wooden stakes at intervals of not more than 12 feet. The fence shall be maintained in working order for the duration of construction activities. The USFWS-approved biologist or designated trained construction monitor shall inspect the fence

daily and notify the construction foreman when fence maintenance is required. The fence shall allow for wildlife passage across the work area at intervals to be determined in conjunction with USFWS and CDFW.

- If feasible, construction activities in and adjacent to the sloughs shall take place during the dry season and before the first rain of the season, especially vegetation removal. Avoid working at night or during rain events when special-status amphibians and mammals are generally more active. Consult weather forecasts from the National Weather Service at least 72 hours prior to performing work.
- During vegetation removal in or adjacent to the sloughs, with the authorization of the USFWS and CDFW, the agency-approved biological will be present (or on call) to relocate CRLF (and WPT) as needed. The approved biologist shall have the authority to stop work that may result in the "take" of a special-status species. The biologist will thoroughly check all vegetation for CRLF, WPT, and other wildlife species prior to vegetation removal activities.
- The approved biologist or construction monitor will check under all equipment for wildlife before use. If any special-status wildlife is observed under equipment or within the work area, the approved biologist will be permitted to handle and relocate it.
- At the end of each work day, excavations shall be secured with a cover, or a ramp installed to prevent wildlife entrapment.
- All trenches, pipes, culverts or similar structures shall be inspected for animals prior to burying, capping, moving, or filling.

- To minimize take of CRLF during maintenance activities, restrict mowing and pruning to the dry season, after April 15 if feasible, or wait at least 2 weeks after March or April rains.
- To minimize vehicle strikes of CRLF, if feasible, restrict parking to daytime hours.
- To enhance potential CRLF aquatic breeding habitat, and minimize take of CRLF and degradation of its habitat during Program operation, develop a Conceptual Mitigation Plan (CMP) for CRLF and other sensitive resources. The details of this program will be developed in consultation with USFWS and CDFW. The program will include:
  - As noted in the Program Description, installation of fish exclusion fencing under the boardwalks to isolate waters upstream of the boardwalks from predatory non-native fish species.
  - Humane removal of non-native predators in off-channel ponds or other potential breeding ponds lacking direction connection to the larger slough system.
  - Restriction of mowing and pruning to the dry season (typically from April 15 to October 15).
  - In the event that the Land Trust biologist identifies degradation of CRLF habitat, the program will include provisions for adaptive management to modify and/or supplement existing measures.

  The program may include:
  - In conjunction with mitigation for displaced "other waters" or other sensitive habitats (described in Impact BIO-2 and BIO-3 below), creation or enhancement of off-channel breeding habitat within WSF, and planting of adjacent refuge habitat with native vegetation.

Southwestern Pond Turtle. The southwestern pond (WPT) is a CDFW Species of Special Concern (CDFW 2023c, Thompson et al. 2016). A WPT carcass was observed near proposed Boardwalk/Fish Screen B during 2021 surveys. The CNDDB documents an individual WPT is in Struve Slough in 2007 (CNDDB 2020a,b). In 2019, a gravid female was found on Main Street by Struve Slough and was relocated back into Struve Slough with suitable nesting habitat nearby (Reis 2020). The sloughs within the Study Area and adjacent uplands provide suitable habitat for this species. The WPT may utilize the grasslands of the

Study Area for nesting and, if work is conducted in spring, the WPT may move through upland work areas adjacent to the sloughs.

IMPACT BIO-1B: The proposed Program may result in temporary impacts to WPT, if present, during construction, including grubbing and vegetation removal, grading, work within and adjacent to the sloughs, and equipment and vehicle operation and access.

Work occurring directly in Hanson Slough may temporarily disrupt potential WPT basking, foraging and movement in the slough through increased noise levels, vibrational, and visual disturbances, and barriers to movement. Construction activities within the slough would occur during the dry season, when the water level is lowest. In addition, construction activities would temporarily degrade potential WPT habitat in and adjacent to the construction footprint through the introduction of sediment and potential unanticipated releases of equipment fuel, hydraulic fluid, or other potentially hazardous substances used in construction equipment.

Female WPT may move through the work areas adjacent to the sloughs during construction. Construction equipment, grading, and earth moving could cause direct injury or mortality to WPT, as well as harassment though increased noise levels, vibrational, and visual disturbances, and barriers to movement and dispersal. These activities could interfere with WPT breeding.

On-going maintenance activities around Program amenities, such as mowing, pruning, and trail repair could also result in direct impacts to WPT during female walkabout.

During construction, erosion and sediment control measures would be installed and maintained to reduce sediment and chemical-laden runoff introductions. These best management practices would be incorporated into Program plans and would reduce potential impacts to WPT and habitat to **less-than-significant**. The following measures will further reduce potential impacts to WPT to less than significant.

- See measures listed for CRLF under Impact BIO-1A above, including a construction monitoring plan, exclusion fencing, environmental training, timing of work (dry season) in the sloughs, and biological monitoring and agency-approved relocation (if necessary).

Avian Species

Both sensitive and common avian species (such as those species listed in **Appendix E**) are likely to utilize the habitats of the Study Area and the surrounding area for nesting activities. The northern harrier and grasshopper sparrow (if present) may utilize the non-native and restored native grasslands within the Study Area for breeding. The bald eagle, the golden eagle, the white-tailed kite, and other raptors, including owls, may utilize larger trees near the Study Area for nesting. If present, the peregrine falcon may utilize steeper clifflike embankments for nesting. If present, Lawrence's goldfinch, oak titmouse, yellow warbler, and olive-sided flycatcher may utilize oak woodland, riparian, ornamental trees, and/or coastal scrub for nesting. The oak titmouse may also nest within the Study Area in posts with cavities. The burrowing owl (wintering) and tricolored blackbird are unlikely to be affected by Program construction activities, which would not occur during winter months when these species may be present in the Study Area. In the event that construction occurs during winter months, protective measures have been identified below. All of the habitats within the Study Area provide potential nesting habitat for common avian species (**Appendix E**).

Breeding bird season is typically February 1 to September 1. All nesting birds of prey (i.e., hawks and owls), other native nesting birds and their occupied nests, and individual birds of prey and passerine birds are protected by the MBTA and CFGC 3503 and 3503.5. Sensitive bird species receive additional protections, primarily for nesting activities with some species (such as "Fully Protected" species) receiving additional protection for wintering and foraging activities.

IMPACT BIO-1C: Program activities associated with construction of the proposed amenities which occur during the avian breeding season (February 1 to September 1) may disrupt breeding activities, cause nest abandonment or failure, or directly harm or cause mortality to nesting birds, eggs, and young located within the Study Area and surroundings. Vegetation removal may result in direct harm or mortality to nesting avian species.

Construction activities, including grubbing and vegetation removal, grading/earth moving, excavation, and equipment and vehicle operation and access will generate increased dust, noise, and vibrational and visual disturbances. These activities may disrupt sensitive and common bird species nesting within the Study Area.

Lighting associated with Program improvements could negatively impact birds and other wildlife species, including but not limited to interrupting sleep patterns of diurnal animals such as many bird species; serving as an attractant to insects (and in turn bats) and amphibians, thereby drawing them to human occupied areas and making them more susceptible to predation; deterring nesting birds and wildlife movement from utilizing lighted areas, and reducing available habitat. Visitor access would be limited to daylight hours; therefore, lighting would be utilized only where necessary for function and safety and would be dark sky compliant to minimize light pollution and glare [i.e. mounted as low to the ground as practicable, directed downward, shielded (no bare bulbs) and utilize long wavelengths (amber and red) where possible].

Implementation of the following measures will reduce potential impacts to less-than-significant:

- The avian breeding season occurs between February 1 and September 1. If feasible, perform vegetation removal activities outside of breeding bird season to avoid direct harm or mortality to potential nesting bird species and other sensitive biological resources.
- For all project activities initiated during the breeding bird season, or if construction activities lapse for a period of one weeks or more during breeding bird season, a qualified biologist will conduct a breeding bird survey for nesting birds, including raptors. Surveys will be conducted within 7 days, prior to beginning construction activities and will include all work, staging, access areas, and minimum survey radii surrounding the work area as follows:
  - 250 feet for non-raptors;
  - 500 feet for small raptors such as accipiters; and
  - 1,000 feet for larger raptors such as buteos.

  The survey will include potential habitat for raptors and sensitive and common nesting avian species known to occur within the Study Area.
- If no nesting sensitive or common avian species are observed during breeding bird surveys no additional measures would be required.
- If common nesting birds are observed within or adjacent to vegetation proposed for removal, postpone vegetation removal activities until young have fledged to avoid direct harm or mortality of

nesting birds and/or establish buffers depending on the activity and appropriate to the species, such as protective buffers recommended in PG&E et al. (2015);

- Sensitive bird species, if nesting in or near the Project Area, will be given special consideration and may require additional protective measures as determined through consultation with the relevant agency (USFWS or CDFW), such as protective buffers recommended in PG&E et al. (2015):
  - bald eagle, golden eagle: 1,300 feet;
  - northern harrier, white-tailed kite, and other raptors: 300 feet;
  - Lawrence's goldfinch, grasshopper sparrow, yellow warbler: 75 feet; and
  - oak titmouse, olive-sided flycatcher: 50 feet.
- A qualified biologist will monitor active nest sites for construction-related disturbances and adjust protective buffers as necessary to prevent further disruption of nesting activities.

The following measures will be implemented as Best Management Practices to protect wintering sensitive bird species, if present:

- If any work is performed during the burrowing owl and tricolored blackbird wintering period (November – March), conduct a survey for these species. The survey will be conducted by a qualified biologist[14] and include the project area and suitable habitat within 150 meters (490 feet).

  If burrowing owls are detected:
  - place visible markers near occupied burrows and fence off suitable habitat;
  - avoid direct destruction of burrows, and
  - include the burrowing owl in the environmental training for construction personnel (see protective measures for CRLF above).

CDFW may require additional protective measures for wintering tricolored blackbirds, if observed.

- To avoid potential burrowing owl habitat, to the greatest extent feasible, avoid destruction of fossorial mammal burrows during construction.

San Francisco Dusky-footed Woodrat

The San Francisco dusky-footed woodrat is considered a CDFW Species of Special Concern (Bolster 1998, CDFW 2023c). During field surveys, woodrat houses were identified only in the riparian vegetation along the southern portion of WSF. However, coastal scrub, oak woodland, and riparian habitats, especially those adjacent to aquatic features and other edge habitats, provide potential habitat for this species.

IMPACT BIO-1D: Vegetation removal in coastal scrub, oak woodland, or riparian habitats may directly impact woodrats or their houses, if present. Construction may directly impact woodrat individuals if present within the work area.

Implementation of the following measures will reduce potential impacts to less-than-significant:

[14] A qualified burrowing owl biologist will have:
1. Familiarity with the species and its local ecology;
2. Experience conducting habitat assessments and non-breeding and breeding season surveys, or experience with these surveys conducted under the direction of an experienced surveyor;
3. Familiarity with the appropriate state and federal statutes related to burrowing owls, scientific research, and conservation; and
4. Experience with analyzing impacts of development on burrowing owls and their habitat.

- Prior to construction, a qualified biologist shall conduct a preconstruction survey for woodrat houses, and clearly flag all houses within the construction impact area and immediate surroundings.
- The construction contractor shall avoid woodrat houses to the extent feasible by installing a minimum 10-foot (preferably 25-foot) buffer with silt fencing or other material that shall prohibit encroachment. If this buffer and avoidance is not feasible, the qualified biologist shall allow encroachment into the buffer, but preserve microhabitat conditions such as shade, cover and adjacent food sources.
- If avoidance of woodrat houses is not possible, in coordination with CDFW, a qualified biologist shall develop and implement a San Francisco Dusky-footed Woodrat Relocation Plan such as that provided in **Appendix F**.

See also avoidance and monitoring measures, as listed for CRLF under Impact BIO-1 above.

Bats

Western red bat and other sensitive bat species may utilize the riparian forest for roosting. Common bats may utilize the steel barn, oak woodland, riparian habitats, and ornamental trees for roosting. Bat maternity roosting occurs typically between May 1 and September 1, and winter hibernacula (shelter occupied during the winter by a dormant animal) for many bat species are found between November 1 and February 15. All roosting bats, including individual roosts, winter hibernacula, and maternity roosts, are protected under California Fish and Game Codes (2016).

IMPACT BIO-1E: Rehabilitation of the steel barn, tree removal or work in or adjacent to oak woodland, riparian forest, or ornamental trees may impact roosting bats, if present. If roosting bats are present in trees proposed for pruning, limbing, or removal, direct harm or mortality of bats may occur. Noise, vibrations, dust, and other disturbances associated with construction activities may disrupt bat maternity roosts, if present.

Implementation of the following measures will reduce potential impacts to less-than-significant:

- If feasible conduct limbing/tree removal operations between September 15 and November 1 to avoid bat maternity roosts and winter hibernacula, as well as other sensitive biological resources.
- To avoid impacts to individual roosts, winter hibernacula, and maternity roosts, during all months, prior to limbing/tree removal, or rehabilitation of the steel barn a qualified biologist shall conduct a pre-construction survey for bats to determine if crevice or foliage roosting bats are present, as follows:
    - A qualified biologist shall determine if bats are utilizing the site for roosting. For any buildings or trees/snags that could provide roosting space for cavity or foliage-roosting bats, potential bat roost features shall be thoroughly evaluated to determine if bats are present. Visual inspection and/or acoustic surveys shall be utilized as initial techniques. If roosting bats are found, the biologist shall develop and implement acceptable passive exclusion methods in coordination with or based on CDFW recommendations. If feasible, exclusion shall take place during the appropriate windows (September 1and November 1) to avoid harming bat maternity roosts and/or winter hibernacula. (Authorization from CDFW is required to evict winter hibernacula for bats).

- If established maternity colonies are found, in coordination with CDFW, a buffer shall be established around the colony to protect pre-volant young from construction disturbances until the young can fly; or implement other measures acceptable to CDFW.
- If a building or tree is determined not to be an active roost site for roosting bats, proceed with work immediately. For trees to be limbed or removed, proceed as follows:
  - If foliage roosting bats are determined to be present (e.g. hoary bat or western red bat), limbs shall be lowered, inspected for bats by a bat biologist, and chipped immediately or moved to a dump site. Alternately, limbs may be lowered and left on the ground until the following day, when they can be chipped or moved to a dump site. No logs or tree sections shall be dropped on downed limbs or limb piles that have not been in place since the previous day.
- If the tree is not limbed or removed within four days of the survey, the survey efforts shall be repeated.

7.2 SENSITIVE HABITATS/VEGETATION REMOVAL

Have a substantial adverse effect on any riparian habitat or sensitive natural community identified in local or regional plans, policies, regulations (e.g., wetland, native grassland, special forests, intertidal zone, etc.) or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐

Within the Study Area, five sensitive habitats, (coastal scrub, coast live oak woodland, wetland, mixed willow riparian/wetland forest, and aquatic) will be impacted by the Community Harvest Program (**Figures 5a-5d**). The Study Area also includes habitats that support sensitive wildlife species [such as CRLF (aquatic habitat and upland, movement, and dispersal habitat), WPT, San Francisco dusky-footed woodrat and sensitive bird species] and areas of high biological diversity, such as edge habitats. Edge habitats occur between coastal scrub, oak woodland and non-native grassland habitats on the WSF property and along the edge of mixed willow riparian and emergent wetland habitat bordering the Watsonville Sloughs complex and Chivos Pond. Table 2 and **Figures 5a-5d** present potential impacts associated with the Program by habitat type, including sensitive habitats and ESHA. Potential impacts within developed, ruderal, and ornamental habitat types reflect improvements that will be situated within existing facilities.

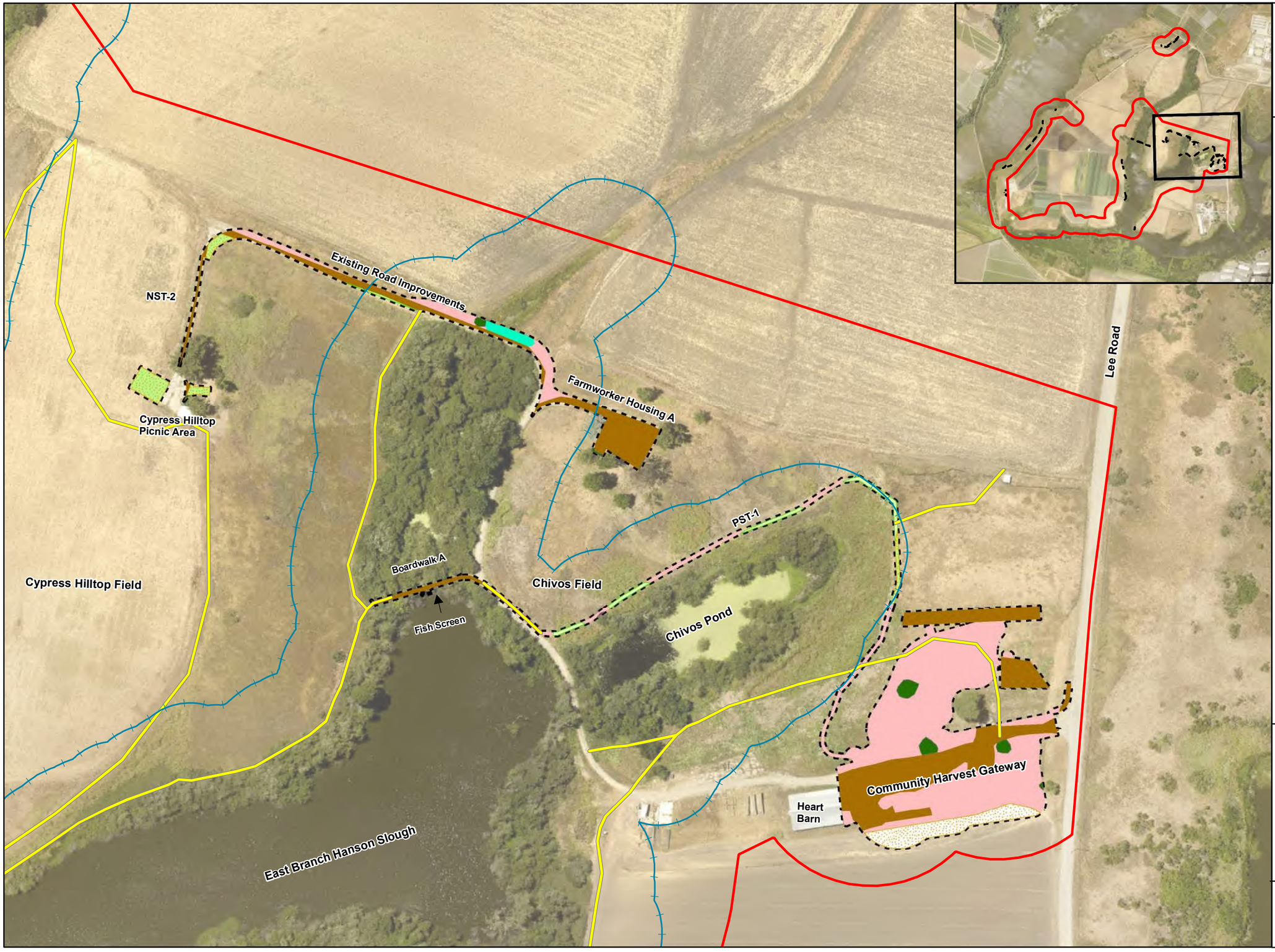
Table 2. Watsonville Slough Farms Community Harvest Program Impacts to Habitat Types.

Habitat Type*	Proposed Impacts (Acres)
Agriculture**	0.30
Aquatic	**0.01**
Coast Live Oak Woodland	**0.02**
Coastal Scrub (*Baccharis pilularis* Alliance)	0.09
Coastal Scrub (*Toxicodendron diversilobum* Alliance)	**0.01**
Developed	0.94
Freshwater Emergent Marsh	**0.06**
Mixed-Willow Riparian Forest (*Salix lasiolepis* and *Salix lasiandra* Alliances)	**0.03**
Non-native Grassland	0.09
Ornamental Trees	0.05
Ruderal-Conium maculatum	0.12
Ruderal-Mixed herbaceous	1.41
Seasonal Wetland	**0.01**
Total	3.14
Total Sensitive Habitats (in bold)	**0.14**

***** Sensitive habitat types are indicated in bold.

****** Impacts to agricultural fields are in the vicinity of the Community Harvest Gateway parking lot, and a future design revision may move the Gateway facility northward to reduce these impacts.

Coastal scrub is considered ESHA by the County of Santa Cruz Local Coastal Program (LCP) (Santa Cruz County 1994) and County of Santa Cruz sensitive habitat (Santa Cruz County Code 16.32). However, the *Baccharis pilularis* (G5/S5) and *Toxicodendron diversilobum* (G4/S4) Alliances are not considered sensitive by CDFW or other relevant regulatory agencies. Moreover, the disturbed, early successional phase of *Baccharis pilularis* Alliance does not meet the criteria for ESHA or EVH due to the prevalence of weeds and other perturbations (e.g., invasive weeds, buried asphalt, industrial refuse).



ECOSYSTEMS WEST CONSULTING GROUP

Figure 5-a

Potential Impacts to Natural Vegetation Communites and Habitat Types

Watsonville Slough Farms Community Harvest Program

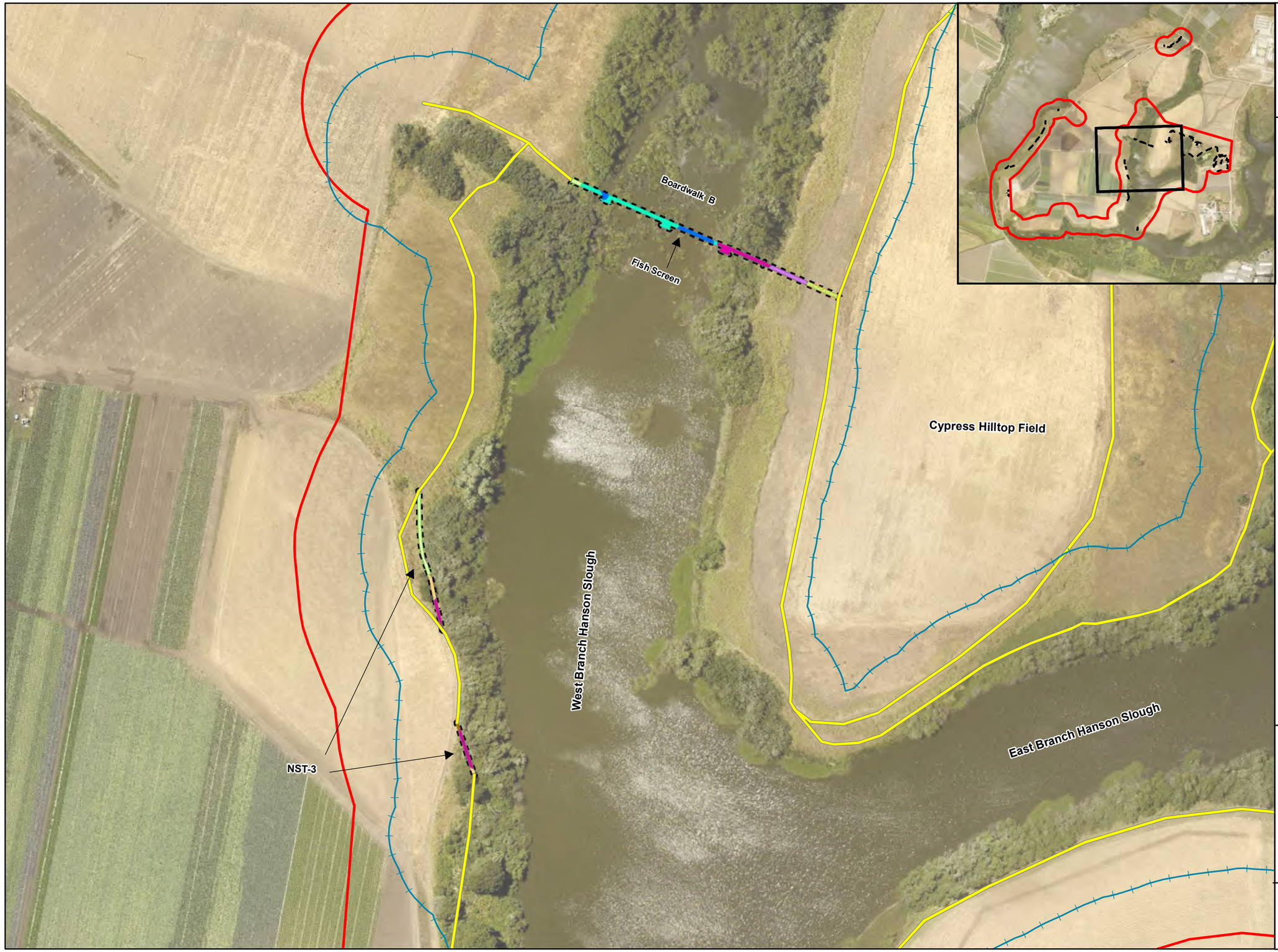
- Biological Study Area
- Impact Areas
- Agriculture
- Freshwater Emergent Marsh
- Seasonal Wetland
- Aquatic-Open Water
- Developed
- Mixed willow forest
- Non-native grassland
- Ornamental trees
- Poison oak-Blackberry scrub
- Ruderal-Conium maculatum
- Ruderal-mixed herbaceous
- 100-foot Wetland Buffer
- Existing Trail
- Observation Platforms
- NST Natural Surface Trail
- PST Pervious Surface Trail

1 inch=150 feet

0 75 150 300 Feet

Drawn By: J. Davilla, ESW
Date: 2/1/2024
Filepath: E:\Watsonville Slough Farms
Image: ESRI Basemap

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



ECOSYSTEMS WEST CONSULTING GROUP

Figure 5-b

Potential Impacts to Natural Vegetation Communites and Habitat Types

Watsonville Slough Farms Community Harvest Program

- Biological Study Area
- Impact Areas
- Agriculture
- Freshwater Emergent Marsh
- Seasonal Wetland
- Aquatic-Open Water
- Developed
- Mixed willow forest
- Non-native grassland
- Ornamental trees
- Poison oak-Blackberry scrub
- Ruderal-Conium maculatum
- Ruderal-mixed herbaceous
- 100-foot Wetland Buffer
- Existing Trail
- Observation Platforms
- NST Natural Surface Trail
- PST Pervious Surface Trail

N W E S

1 inch=150 feet

0 75 150 300 Feet

Drawn By: J. Davilla, ESW
Date: 2/1/2024
Filepath: E:\Watsonville Slough Farms
Image: ESRI Basemap

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

ECOSYSTEMS WEST CONSULTING GROUP

Figure 5-c

Potential Impacts to Natural Vegetation Communites and Habitat Types

Watsonville Slough Farms Community Harvest Program

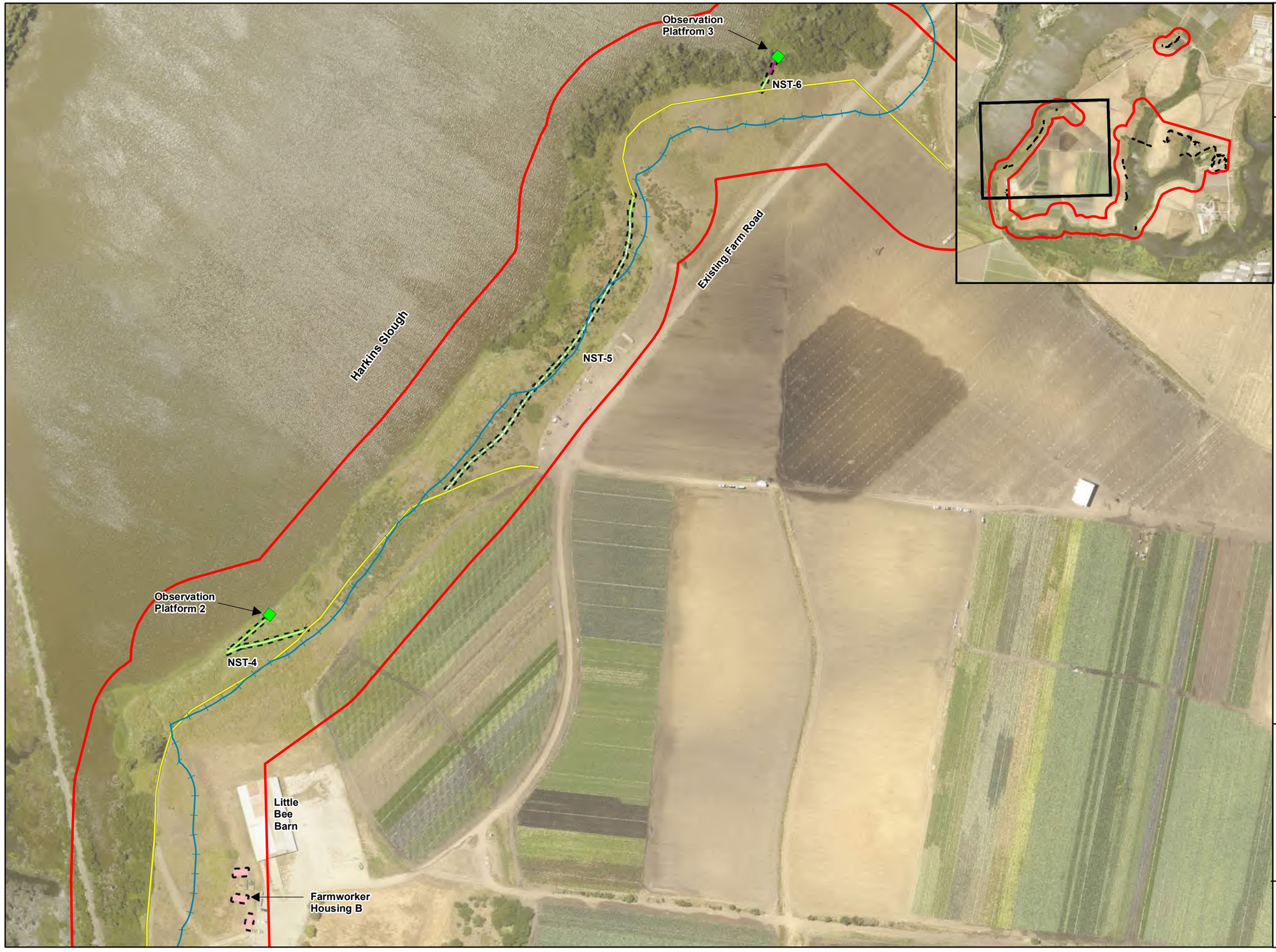
- Biological Study Area
- Impact Areas
- Agriculture
- Freshwater Emergent Marsh
- Seasonal Wetland
- Aquatic-Open Water
- Developed
- Mixed willow forest
- Non-native grassland
- Ornamental trees
- Poison oak-Blackberry scrub
- Ruderal-Conium maculatum
- Ruderal-mixed herbaceous
- 100-foot Wetland Buffer
- Existing Trail
- Observation Platforms
- NST Natural Surface Trail
- PST Pervious Surface Trail

1 inch=150 feet

0 75 150 300 Feet

Drawn By: J. Davilla, ESW
Date: 2/1/2024
Filepath: E:\Watsonville Slough Farms
Image: ESRI Basemap

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



ECOSYSTEMS WEST CONSULTING GROUP

Figure 5-d

Potential Impacts to Natural Vegetation Communites and Habitat Types

Watsonville Slough Farms Community Harvest Program

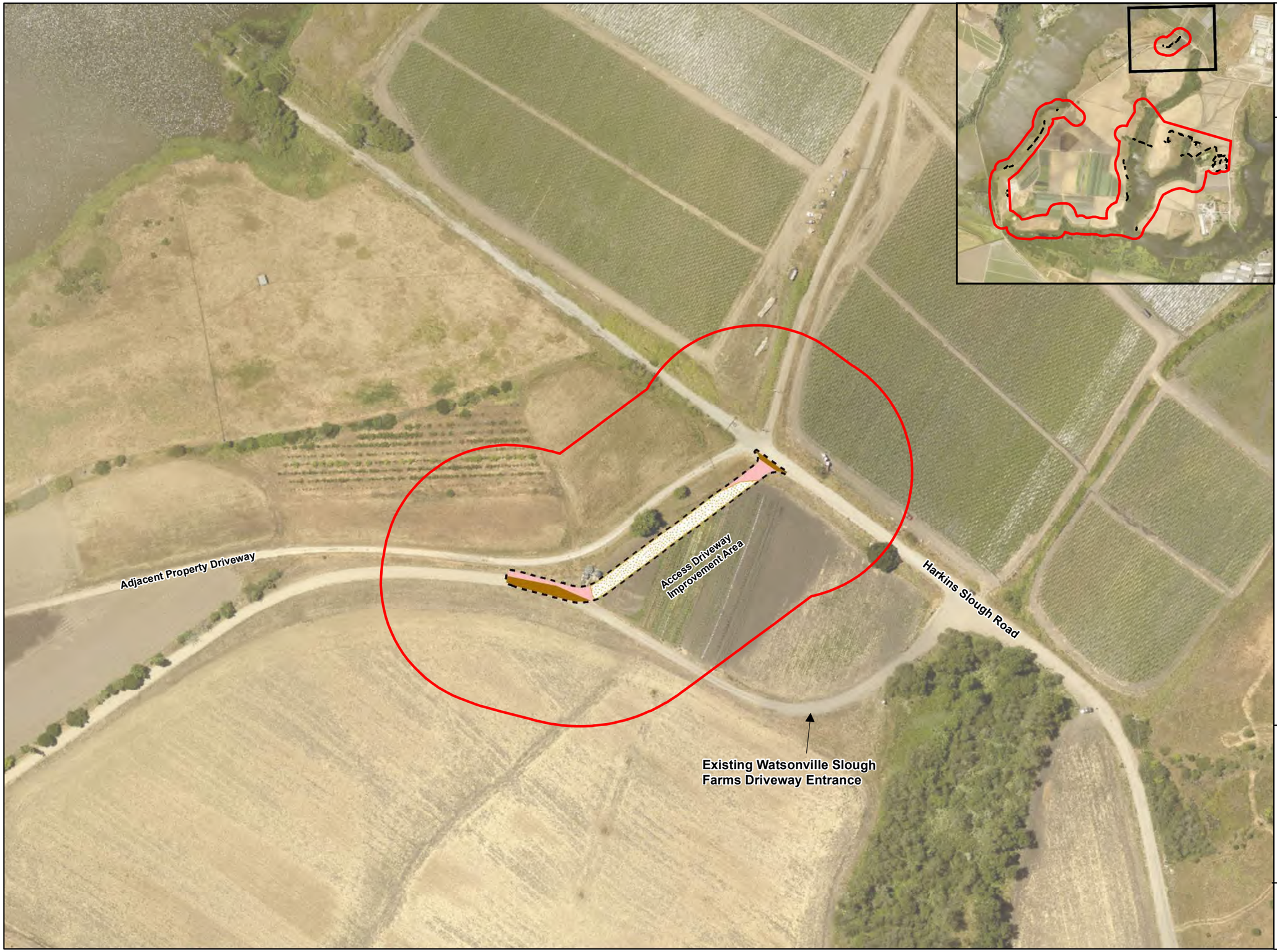
- Biological Study Area
- Impact Areas
- Agriculture
- Freshwater Emergent Marsh
- Seasonal Wetland
- Aquatic-Open Water
- Developed
- Mixed willow forest
- Non-native grassland
- Ornamental trees
- Poison oak-Blackberry scrub
- Ruderal-Conium maculatum
- Ruderal-mixed herbaceous
- 100-foot Wetland Buffer
- Existing Trail
- Observation Platforms
- NST Natural Surface Trail
- PST Pervious Surface Trail

1 inch=225 feet

0 112.5 225 450 Feet

Drawn By: J. Davilla, ESW
Date: 2/1/2024
Filepath: E:\Watsonville Slough Farms
Image: ESRI Basemap

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



ECOSYSTEMS WEST CONSULTING GROUP

Figure 5-e

Potential Impacts to Natural Vegetation Communites and Habitat Types

Watsonville Slough Farms Community Harvest Program

- Biological Study Area
- Impact Areas
- Agriculture
- Freshwater Emergent Marsh
- Seasonal Wetland
- Aquatic-Open Water
- Developed
- Mixed willow forest
- Non-native grassland
- Ornamental trees
- Poison oak-Blackberry scrub
- Ruderal-Conium maculatum
- Ruderal-mixed herbaceous
- 100-foot Wetland Buffer
- Existing Trail
- Observation Platforms
- NST Natural Surface Trail
- PST Pervious Surface Trail

1 inch=225 feet

0 75 150 300 Feet

Drawn By: J. Davilla, ESW
Date: 2/1/2024
Filepath: E:\Watsonville Slough Farms
Image: ESRI Basemap

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Within the Study Area, coastal scrub is located primarily on the sloped embankments above Hanson Slough and Harkins Slough.

Mixed willow riparian forest is considered an ESHA and sensitive habitat type by the County of Santa Cruz LCP, Sensitive Habitat Ordinance, and Riparian Corridor and Wetlands Protection Ordinance (Santa Cruz County Code 16.30, 16.32). The *Salix lasiolepis-Salix lucida* Association is also described as a sensitive natural community by CDFW. These areas are also regulated as wetland habitats by the California Coastal Commission when dominated by arroyo willow and Pacific willow, both facultative wetland (FACW) species. Riparian communities are considered sensitive habitat due to their value to wildlife, limited distribution, and decreasing acreages statewide.

The County of Santa Cruz Sensitive Habitat Protection ordinance requires mitigation for any unavoidable environmental impacts to sensitive habitats, including degradation, caused by the project. Avoidance and minimization measures are recommended for the protection of these habitats.

IMPACT BIO-2: Construction and operation of new Community Harvest Program trail segments and visitor amenities may adversely affect wetland and riparian habitat and other sensitive natural communities.

Construction

Coastal Scrub. Construction of Community Harvest Program elements would permanently impact 0.01 acres (575 square feet) of sensitive coastal scrub (*Toxicodendron diversilobum* Alliance). Equipment access, grubbing, vegetation removal, excavation, grading, and trail construction will result in permanent impacts to coastal scrub. Any vegetation removed would be replaced in-kind onsite. Where permanent loss occurs, this impact would be mitigated through in-kind replacement or enhancement in close proximity to the area of disturbance.

Coast Live Oak Woodland. Although Coast live oak trees are not proposed for removal, approximately 0.02 acres (1,000 square feet) of associated understory habitat will be permanently impacted by a new trail segment above the West Branch of Hanson Slough. Mitigation could include restoration or enhancement of the Coast live oak woodland by planting additional trees or removing invasive weeds and planting native understory species including California blackberry, snowberry, and coffeeberry.

Mixed Willow Riparian Forest. Approximately 0.03 acres (1,450 square feet) of mixed willow riparian is anticipated to be permanently displaced by the proposed Community Harvest Program. During construction of the boardwalk crossings, activities such staging, equipment access, construction of temporary access roads, construction of abutments and the boardwalk approaches may result in temporary disturbances to arroyo willow riparian, largely limited to pruning or limbing to allow for access. Some grubbing or grading may be required. If severely pruned or limbed, it is anticipated that mixed willow riparian vegetation would resprout from the stumps and roots. Permanent and temporary impacts to arroyo willow riparian would be mitigated onsite (or in close proximity) as necessary through in-kind replacement and/or enhancement.

CRLF Habitat. Upland habitats that may support CRLF refuge, movement, and dispersal include those sensitive habitats listed above as well as non-native grassland, restored native (coastal prairie) grassland, coastal scrub, and fallow agricultural fields. Impacts to potential CRLF habitat and mitigation are described in **Impact BIO-1A** above.

Edge Habitats/Habitats of High Biological Diversity. Within the Study Area edge habitats occur on the WSF Community Harvest Study Area between coastal scrub and non-native grassland habitats and along the edge of mixed willow riparian habitat along the margins of Hanson Slough, Harkins Slough, and Chivos Pond. Minimal to no direct impacts to edge habitats are anticipated as a result of the proposed Community Harvest Program. Temporary disturbance may result from new natural surface trail construction in these areas. Equipment access, grubbing, vegetation removal, excavation, grading, and trail construction may result in temporary disturbance to edge habitats. Any vegetation removed would be replaced in-kind onsite. If permanent loss occurs, this impact would be mitigated through in-kind replacement or enhancement in close proximity to the area of disturbance.

Operation

The proposed Community Harvest Program would introduce increased visitation to the WSF property, as well as potential unauthorized access into the adjacent CDFW Reserve east of Lee Road, and leased agricultural lands within WSF. Public access to the WSF will require invitation by the LTSCC and the entrance roads will be gated and locked during non-visitation periods. Increased usage and development of the property, including trail accessibility, may inadvertently result in illegal transient encampments, particularly in the areas that provide shelter such as the coastal scrub, oak woodland, and mixed willow riparian habitats. The increased human presence through trail use and unauthorized may degrade sensitive habitats, including edge habitats through introduction of additional invasive weeds, off-trail trampling and compaction, significant alteration of the native vegetation, increased trash, urine and fecal matter, and pollution of aquatic habitat.

The proposed Community Harvest Program would introduce increased visitation to the WSF property, as well as potential unauthorized access into the adjacent CDFW Reserve east of Lee Road, and leased agricultural lands within WSF. Public access to the WSF will require invitation by the LTSCC and the entrance roads will be gated and locked during non-visitation periods. Increased usage and development of the property, including trail accessibility, may inadvertently result in illegal transient encampments, particularly in the areas that provide shelter such as the coastal scrub, oak woodland, and mixed willow riparian habitats. The increased human presence through Program implementation may degrade sensitive habitats, including edge habitats through introduction of additional invasive weeds, off-trail trampling and compaction, significant alteration of the native vegetation, increased trash, urine and fecal matter, and pollution of aquatic habitat.

Minimization measures have been incorporated into the Program design including: the establishment of farmworker housing facilities, the residents of which will deter entry during closed hours and unauthorized camping; and provision of restrooms. The Land Trust will also use staff presence, signage, fencing and hours of operation to manage visitor impacts.

Although WSF will only be accessible to invited guests and agricultural lessees, regular patrol by local law enforcement and regular maintenance visits by the LTSCC would deter and reduce unpermitted access and potential degradation of sensitive habitats.

- To the greatest extent feasible, equipment should be staged in ruderal and developed areas only and construction workers and equipment will access the trail alignment existing farm roads. Confine project activities and operation of equipment and vehicles, including site access and parking, to designated staging areas. The construction footprint, including removal or disturbance of existing vegetation will be minimized.

- Sensitive habitats will be temporarily fenced to prevent encroachment during construction
- Where feasible, avoid grubbing and construction within 100 feet of the edge of sensitive habitats Restrict and minimize access roads into Struve Slough to the greatest extent feasible.
- Clean all equipment caked with mud, soils, or debris from offsite sources or previous project sites prior to staging equipment on site to avoid introducing or spreading invasive exotic plant species into the adjacent remaining habitats. All equipment used on the premises should be cleaned prior to leaving the site for future projects.
- Program implementation will result in no-net-loss of coastal scrub, coast live oak woodland, or mixed willow riparian forest. Where temporary impacts to sensitive habitats occur, allow to revegetate naturally or outplant as needed with locally-sourced native plantings. Adjacent non-native grassland and ruderal habitats may also be planted with native vegetation.
- Upon project completion, areas remaining outside the project footprint could be planted with a planting palate of suitable native species. This will include using a native seed mix and container plants where appropriate. The native seed mix will be developed in coordination with Watsonville Wetlands Watch or other qualified restoration contractor, to ensure proper species selection and application rates. Sterile barley or wheat may be used as erosion control in the first year following disturbance but the seed must have a minimum purity of 95 percent and 85 percent germination rate. A preliminary seed mix recommended for revegetation is included in **Appendix F**.
- In areas within, outside and adjacent to the project footprint, remove invasive species, particularly those designated by Cal-IPC as having moderate to high potential for "severe ecological impacts on physical processes, plant and animal communities, and vegetation structure."
- To compensate for the loss of, and to minimize degradation of sensitive habitats during Program operation, LTSCC shall develop a CMP. The details of this program will be developed in consultation with the relevant regulatory agencies, including the County of Santa Cruz. The program will include:
    - Strategies to protect sensitive habitat from degradation associated with Program operation and to enhance core areas to improve habitat values.
    - Monitoring of sensitive habitat (at a frequency to be determined in consultation with the agencies) to ensure degradation is not occurring.
    - In the event that the monitoring biologist identifies degradation of sensitive habitat, the program will include provisions for adaptive management to modify and/or supplement existing mitigation measures.
    - Monitoring and eradication of invasive weeds to prevent further encroachment into sensitive habitat areas.

  The program may include:

In conjunction with mitigation for displaced wetlands or CRLF habitat (described in **Impact BIO 1-A** above and **BIO-3** below), creation or enhancement of sensitive habitats elsewhere on Watsonville Slough Farm

7.3 WETLANDS/OTHER WATERS

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?	☐	☒	☐	☐

Proposed construction of new trail segments, boardwalk crossings, and viewing platforms would result in minor temporary and permanent impacts to wetlands and associated habitats, including impacts to mixed willow Coastal Act wetlands (discussed above in the sensitive habitats section), palustrine emergent wetland, and aquatic (Hanson Slough). A jurisdictional aquatic resources delineation report is being prepared for the Project Area.

Work within wetlands and "other waters" is subject to regulation by the USACE under Section 404 of the CWA, by the Regional Board under Section 401 of the CWA and Porter Cologne Water Quality Act, and by CDFW under Section 1600. It is anticipated that the proposed project would require permits and approvals from these agencies.

Wetlands are also granted protections under the County's LCP, Sensitive Habitat Protection, and Riparian Corridor and Wetlands Protection ordinances (SCCC 16.30 and 16.32). In order to conduct work within 100 feet of a wetland, the project must be granted a Wetland and Riparian Exception Permit. Based on the following criteria, the Community Harvest Program meets the preliminary requirements for approval of a Wetland and Riparian Exception by the County:

- *There are special circumstances or conditions affecting the property.* The WSF Community Harvest Program would provide scenic nature trail access for invited community members and for students from Santa Cruz County, and the surrounding residential communities. The proposed improved trail network, infrastructural improvements, and amenities provide the safest and most appropriate access available to connect the community with working organic farmlands. Although the new proposed trail segments will displace a small portion of a ruderal seasonal wetland, freshwater marsh, mixed willow wetland, and aquatic habitat, the trail network is primarily situated on existing roads and trails beyond the edge of the WSF active farmlands where impacts to biological resources, including wetlands, CRLF, and wildlife movement would be minimized. An on-site replacement mitigation wetland or substantial restoration and/or enhancements to existing wetlands would provide vastly improved wildlife habitat and wetland functions and values relative to the existing ruderal seasonal wetland, which is dominated entirely by facultative (FAC) invasive weeds. Boardwalk/Fish Screen B will impact a minimal extent of total marshlands (0.4 percent) within the Watsonville Sloughs ecosystem and will be mitigated onsite via restoration and enhancements to existing freshwater marsh along the slough fringes abutting the WSF property.
- *The exception is necessary for the proper design and function of* the Community Harvest Program trail network, a scenic nature trail, which is an allowed activity. Boardwalk/Fish Screen B is not accessible from either the west or east without minor impacts to seasonal wetland, freshwater marsh, or mixed willow wetland habitats. No alternative location for Boardwalk/Fish Screen B would avoid impacts to the ruderal seasonal wetland in this location as it extends for the entire distance of the east embankment of the West Branch of Hanson Slough. The Boardwalks provide a unique opportunity for nature study, particularly seeing thriving wildlife habitat side by side with commercial agriculture.
- *The granting of the riparian exception will not be detrimental to the public welfare or injurious to other property downstream or in the area in which the project is located.* The WSF Community Harvest Program and facilities will be an asset to public welfare in that it is providing safe access for residents and students to connect with working organic farms and the adjacent natural landscape along a scenic nature trail. The proposed trail location is positioned between the sloughs and agricultural fields on primarily along existing roads and trails. Boardwalk/Fish Screen A is proposed to be constructed on top of the existing submerged, paved farm road. The granting of the Wetland and Riparian Exception

in the Coastal Zone will not reduce or adversely impact the riparian corridor; minimal permanent impacts to riparian corridors are anticipated as a result of the proposed Project; and there is no feasible less environmentally damaging alternative to crossing Hanson Slough.

The replacement/mitigation wetland(s) would provide improved wildlife habitat and wetland functions and values and would offset these losses. In general, the CMP detailing mitigation for the proposed Community Harvest Program would enhance habitat conditions within the WSF property and the greater Watsonville Sloughs complex.

- *The granting of the exception, in the Coastal Zone, will not reduce or adversely impact the riparian corridor, and there is no feasible less environmentally damaging alternative.* A total of 0.035 acres of permanent impacts to the riparian corridor (mixed willow riparian) are anticipated as a result of the proposed Program. This impact is required to facilitate the landings of Boardwalks A and B, new trail segments above the west bank of the West Branch of Hanson Slough and Chivos Pond, and the northern viewing platform on Harkins Slough. This impact is unavoidable and there is no feasible less environmentally damaging alternative design for these features.
- *The granting of the riparian exception is in accordance with the purpose of [Chapter 16.30 Riparian Corridor and Wetlands Protection][15], the objectives of the General Plan and elements thereof, and the Local Coastal Program Land Use Plan.* Through the proposed placement and careful design of the trail and other improvements associated with the proposed Community Harvest Program, impacts to the riparian corridor would be minimized and the trail is in accordance with protections, values, and goals of the ordinance. The trail segments satisfy the directives of the County of Santa Cruz General Plan and the LCP by providing direct scenic access to the Hanson Slough, Harkins Slough, Chivos Pond and educational opportunities for the community. The fish screens proposed for Boardwalks A and B would include integrated fish screens to enhance habitat for CRLF by protecting their potential breeding habitat from non-native fish species.

IMPACT BIO-3: The project would adversely affect wetlands, aquatic habitat and associated riparian habitat.

Seasonal Wetland. One ruderal palustrine emergent wetland situated along the east shore of the West Branch of Harkins Slough adjacent to Boardwalk Crossing B would be impacted by a new trail extension as part of Program activities. This marginal wetland is dominated entirely by facultative (FAC) invasive weeds including poison hemlock and bitter dock, and hydrologic indicators limited largely to surface soil cracks and oxidized rhizospheres along living roots demonstrate this wetland is saturated or occasionally inundated for short durations during the rainy season. Moreover, the landscape position and microtopography (slight concave) of the wetland provides some benefits (i.e., ecosystem services) to the larger Watsonville Sloughs system in terms of water quality, sediment sequestration, and nutrient cycling. The homogeneous vegetation and lack of open water provide limited habitat to value to wildlife within the WSF property.

The project would result in 0.01 acres (390 square feet) of permanent impacts to this seasonal wetland feature which would be partially displaced by construction of the proposed trail access to Boardwalk Crossing B, through equipment access, grubbing, vegetation removal, grading, and trail construction.

[15] The purpose of this chapter is to minimize and to eliminate any development activities in the riparian corridor, preserve, protect, and restore riparian corridors for: protection of wildlife habitat; protection of water quality; protection of aquatic habitat; protection of open space, cultural, historical, archaeological and paleontological, and aesthetic values; transportation and storage of floodwaters; prevention of erosion; and to implement the policies of the General Plan and the Local Coastal Program Land Use Plan. [Ord. 3335 § 1, 1982; Ord. 2460, 1977].

Impacts to this feature would be minimized to the extent feasible and permanent loss would be mitigated through replacement and/or enhancement. Mitigation opportunities identified by the Land Trust of Santa Cruz County include creation of new wetland features elsewhere within the WSF property that would result in net ecological benefits for water quality, habitat connectivity, nutrient cycling, sediment sequestration, and wildlife habitat.

Freshwater Marsh. Freshwater marsh occurs at the margins and within shallow portions of the Watsonville Sloughs and is comprised primarily of perennial, emergent hydrophytic species including bulrush, cattail, bog rush, water smartweed, and bur reed. The project would result in 0.05 acres (1,450 square feet) of permanent impacts to freshwater marsh during construction of Boardwalk Crossing B, the southern viewing platform on Hanson Slough, and road improvements for access to the Cypress Hilltop Picnic Area. For construction of these features, activities such staging, equipment access, construction of temporary access roads, construction of bridge abutments and construction of the boardwalk and bridge approaches may result in temporary disturbances to this habitat type. Permanent displacement would be mitigated through onsite creation, substantial restoration, or enhancement, to be described in further detail in the forthcoming CMP.

Mixed Willow Riparian and Wetland. The Community Harvest program would impact 0.03 acres (2,790 square feet) of mixed willow riparian, a Coastal Act wetland habitat, due to construction of Boardwalk Crossings A and B, new trail segments adjacent to Chivos Pond, and the northern viewing platform in Harkins Slough. Temporary impacts may include trimming and limbing of willows to allow access for equipment or staging activities. Temporary impacts would not likely require mitigation if willows are allowed to resprout following project completion. Permanent removal of mixed willow habitat would be mitigated through onsite creation, substantial restoration, or enhancement, to be described in further detail in the CMP.

Aquatic Habitat. Permanent impacts to of 0.01 acres (475 square feet) to the aquatic habitat of Hanson Slough would result from displacement of this habitat by the piers and deck of Boardwalk Crossing B. Temporary impacts could result from construction, including equipment access, construction of temporary access roads, construction of boardwalk piers and decking. Impacts may also occur from the introduction of sediment or construction materials, potential unanticipated releases of equipment fuel, hydraulic fluid, or other potentially hazardous substances used in construction equipment. No temporary or permanent impacts to Hanson Slough are anticipated as a result of installation of Boardwalk Crossing A. Best Management Practices would be employed to minimize water quality impacts, as described in the BMP Section below.

Implementation of the measures listed below would mitigate these impacts to less-than-significant.

- Avoid or minimize disturbance to palustrine emergent wetlands (seasonal wetland and freshwater marsh), mixed willow riparian and wetland forest, and aquatic habitats by having a qualified biologist identify fencing for the work limits, staging, and access areas; and restrict all activity to within this footprint.
- Where feasible, avoid grubbing and construction within 100 feet of the edge of wetlands and other waters per the County of Santa Cruz General Plan/LCP and Sensitive Habitats Ordinance.
- Employ construction techniques that minimize impacts to aquatic habitat, such as using lightweight equipment and constructing the boardwalks stepwise (i.e. beginning with the abutment, use the constructed portion of the boardwalk as a work area from which to place the next pile). If feasible,

to avoid dewatering, construct boardwalks during the late fall, when the slough fingers have dried down.

- Replace and/or enhance displaced features (seasonal wetland and freshwater marsh) at a ratio to be determined in consultation with regulatory agencies. Typical mitigation ratios vary between 2:1 and 4:1 depending on the quality of the displaced habitat. The size and location of replacement wetlands would be developed in the CMP (see below). Onsite mitigation (i.e. within the CDFW Reserve and along channelized Watsonville Slough) would be the preferred location/s for the mitigation wetland(s); the LTSCC has also proposed Watsonville Slough Farm (located adjacent to the CDFW Reserve across Lee Road to the west) as an alternate mitigation wetland site. Develop and implement a CMP that will include the following:
  - Plan mitigation strategies with regulatory agencies including the County of Santa Cruz, Watsonville Wetlands Watch, CDFW, the Regional Board, and USFWS.
  - Description of the Program elements including acreage of temporary and permanent impacts to palustrine emergent wetland, freshwater marsh, mixed willow riparian, and aquatic habitat (Watsonville Sloughs and Chivos Pond, as identified in the formal delineation of jurisdictional wetlands and other Waters of the U.S.;
  - Description of the Program including acreage of temporary and permanent impacts to other sensitive habitats, including coastal scrub, edge habitats and areas of high biological diversity, and CRLF habitat;
  - Goals of compensatory mitigation project including types and areas of wetland and aquatic habitat to be created, restored, and/or enhanced, and mitigation ratios (created/restored/enhanced: impacted);
  - Location and acreage of wetland and riparian mitigation areas including size and ownership status;
  - Detailed construction and planting techniques;
  - Any permanent disturbance to mixed willow riparian habitat will be mitigated through in-kind replacement and/or enhancement.
  - Description and design of habitat requirements for special-status wildlife, including CRLF, occupying wetland and aquatic habitats;
  - Maintenance activities during the monitoring period, including replanting native wetland and riparian vegetation and weed removal, that will not result in take of CRLF;
  - Strategies for protecting the habitat values of the larger Watsonville Sloughs ecosystem, including wildlife movement;
  - Long-term quantitative and qualitative monitoring and reporting, documenting ability to meet or surpass performance criteria; and
  - Adaptive management strategies to ensure long-term viability of mitigation areas.

7.4 WILDLIFE MOVEMENT

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

Wildlife that are moving through the Study Area and surroundings are likely to use the sloughs and adjacent riparian habitat and oak woodland as linear corridors because of the shelter, cover, food and water resources these areas provide. In addition, some species (e.g., CRLF) will move directly between sloughs and branches or fingers of sloughs, utilizing upland habitat (grassland and coastal scrub) and agricultural fields (especially at night).

IMPACT BIO-4: The construction of proposed Program amenities could interfere with wildlife movement temporarily during construction; however, construction in and near the sloughs is confined to small areas, limited in scale, and of relatively short duration. Minimal impact to wildlife movement is expected from operation of the Program because of the regulated visitor access and small scale of Program amenities relative to the overall scale of WSF and on-going agricultural activities.

Construction of the proposed Program amenities in and near the sloughs (Boardwalk Crossings A and B in and near Hanson Slough and Observation Platforms 1-3 adjacent to Harkins Slough and adjacent to the confluence of Hanson and Struve Slough) and limited construction of natural surface trails may temporarily deter wildlife from moving through the Study Area at these locations through increased noise levels, vibrational, and visual disturbances, and barriers to movement. Construction-related deterrents to movement would be temporary, would occur during the dry season, when the water level is the lowest, when CRLF movement would be less, and would occur only during daylight hours, minimizing this potential impact.

Operation of the Program, including increased pedestrian traffic and maintenance near Program amenities of the trail through weeding, mowing, pruning, and trail repair may also deter wildlife movement. Visitor access would be managed to protect biological resources, limited to certain seasons, and would be only open during daylight hours, from dawn to dusk. Lighting associated with Program improvements could negatively impact wildlife movement, including but not limited to interrupting sleep patterns of diurnal animals such as many bird species; serving as an attractant to insects (and in turn bats) and amphibians, thereby drawing them to human occupied areas and making them more susceptible to predation; deterring nesting birds and wildlife movement from utilizing lighted areas, and reducing available habitat. As noted above, visitor access would be limited to daylight hours; therefore, lighting would be utilized only where necessary for function and safety and would be dark sky compliant to minimize light pollution and glare [i.e. mounted as low to the ground as practicable, directed downward, shielded (no bare bulbs) and utilize long wavelengths (amber and red) where possible]. These factors minimize potential operational impacts to less than significant. Further, mitigation measures for CRLF (Impact BIO-1A above) and sensitive habitats (Impact BIO-2), to prevent degradation of existing habitat, further reduce the potential impacts.

We recommend implementation of the measures listed below to further reduce this impact to less-than significant.

- During construction, install protective fencing along select work areas (see BIO-1A) with openings every 50 feet that would allow passage of wildlife.
- With agency approval, a biological monitor would be present during work within the sloughs to relocate wildlife species, if necessary. See also mitigation under BIO-1A above.

7.5 LOCAL POLICIES AND ORDINANCES

Conflict with any local policies or ordinances protecting biological resources (such as the Sensitive Habitat Ordinance, Riparian and Wetland Protection Ordinance, and the Significant Tree Protection Ordinance)?	☐	☒	☐	☐

The County of Santa Cruz Sensitive Habitat Ordinance requires that any unavoidable environmental impacts to sensitive habitats be mitigated. In addition, the ordinance calls for the protection of sensitive habitats "undisturbed by the proposed development activity" or on an adjacent parcel through measures such as conservation easements. Additionally, restoration "commensurate with the scale of the proposed development" is required for degradation of sensitive habitats caused by the project. Impacts to and proposed mitigation for sensitive habitats, including wetlands and aquatic habitat are described under #2 and #3 above, respectively.

The project would require a Riparian Exception in order to be consistent with the County of Santa Cruz Riparian Corridor and Wetlands Protection Ordinance, as described under #3 above. Preliminary analysis has determined that the project complies with these findings. The project is therefore consistent with the County of Santa Cruz Riparian Corridor and Wetlands Protection Ordinance, and impacts from project implementation would be less than significant with mitigation incorporated.

7.6 HABITAT CONSERVATION PLANS

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 proposed project does not conflict with other approved local, regional, or state habitat conservation plans.

7.7 RECOMMENDED BEST MANAGEMENT PRACTICES NATURAL RESOURCE PROTECTION

Below we have listed additional best management practices (BMPs) to further reduce potential impacts to biological resources:

- Follow all conservation regulations, policies, and principles in Chapter 5- Conservation and Open Space of the General Plan and LCP (1994). For wildlife habitats and sensitive communities, including wetlands, follow applicable regulations from Sections 16.30 and 16.32 of the Environmental and Resource Protection section of County of Santa Cruz Municipal Code.
- Refueling and/or maintenance of vehicles and equipment will be performed in designated staging areas. Workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur. Follow all state and federal laws pertaining to hazardous material handling and management.

- Position all stationary equipment such as motors, pumps, generators, and/or compressors over drip pans. Store vehicles and equipment in designated staging area. Position parked equipment over drip pans or absorbent material.
- To the greatest extent possible, stabilize all exposed or disturbed areas within the construction area. Install erosion control measures such as silt fences, weed-free straw bales, plywood, straw wattles, water check bars, and broadcast weed-free straw wherever silt laden water has the potential to leave the work site and enter the nearby drainages. Modify, repair, and/or replace erosion control measures as needed.
- Prohibit smoking or allow workers to smoke in designated areas clear of dry vegetation and away from hazardous materials. Dispose of cigarette butts in an appropriate area away from the project site.
- During construction, all food trash that may attract predators into the work area should be properly contained and removed from the work site on a daily basis. Construction debris and trash should also be properly contained and removed from the work site on a regular basis.

8.0 REFERENCES

Allaback, M. Biosearch Associates. 2016. Personal Communication via e-mail regarding San Francisco dusky-footed woodrat relocation methods, with EcoSystems West biologist, Erin McGinty. December 15, 2016.

Altman, B. and R. Sallabanks. 2012. Olive-sided Flycatcher (Contopus cooperi), version 2.0. The Birds of North America. A. F. Poole, Editor. Cornell Lab of Ornithology, Ithaca, NY. Viewed on-line at: https://doi.org/10.2173/bna.502 (accessed January 2023).

Baicich, Paul J. & J. O. Harrison. 1997. Nests, Eggs, and Nestlings of North American Birds. Second Edition.

Balance Hydrologics, Inc. 2014. Watsonville Sloughs Hydrologic Study. Prepared for The Resource Conservation District of Santa Cruz County. In collaboration with Environmental Data Solutions. Prepared February 14, 2014.

Baldwin B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken, editors. 2012. The Jepson manual: vascular plants of California, second edition. University of California Press, Berkeley.

Barbour, M., T. Keeler-Wolf, and A. A. Schoenherr, Editors. 2007. *Terrestrial Vegetation of California*. *Third Edition*. University of California Press, Berkeley, Los Angeles and London.

Barry, S., S. Larson, and M. George. 2006. California native grasslands: A historical perspective. A guide for developing realistic restoration objectives. *Grasslands*, Winter 2006. California Native Grass Association.

Bartolome, J.W., J.S. Fehmi, R.D. Jackson, and B. Allen-Diaz. 2004. Response of native perennial grass stand to disturbance in Coast Range grassland. *Restoration Ecology* 12(2):279-289.

Beedy, E. C., W. J. Hamilton, III, R. J. Meese, D. A. Airola, and P. Pyle. 2017. "Tricolored Blackbird (Agelaius tricolor)" version 3.0. The Birds of North America. P. G. Rodewald, Editor. Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.tribla.03 (accessed June 2018).

Beier and Loe 1992. "A checklist for evaluating impacts to wildlife corridors." Wildlife Society Bulletin, Volume 20, pp. 434-440.

Biosearch Associates. 2018. Personal Communications with Mark Allaback and Dave Laabs, wildlife biologists, via e-mail regarding occurrences of California red-legged frog and California toad in the vicinity of the Study Area. August 10 and September 27, 2018.

Bossard, C.C., J.M. Randall, and M.C. Hoshovsky (Eds.). 2000. Invasive plants of California's wildlands. Berkeley: University of California Press.

Bowman, R. H. and D. C. Estrada. 1980. Soil survey of Santa Cruz County, California. U.S. Dept. of Agriculture, Soil Conservation Service. 148 pp. & maps.

Brown, P. E., R. Berry and E. D. Pierson. 1996. Recommended bat survey methods checklist. Transactions of the Western Section of the Wildlife Society. 1996(32): 48.

Buehler, D. A. 2000. Bald Eagle (Haliaeetus leucocephalus), version 2.0. In The Birds of North America (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.506

Byrne, Jeanne. 2016. Eagle Report. Higher Ground Organics. April 5, 2016. Viewed on-line at: http://www.highgroundorganics.com/the-journal/eagle-report/

California Code of Regulations, Title 14. 2023. https://govt.westlaw.com/calregs/Browse/Home/California/CaliforniaCodeofRegulations?guid=IF7C668245B4C11EC976B000D3A7C4BC3&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default)

California Fish and Game Code (CDFC). 2019. Viewed on-line at: Codes: Codes Tree - Fish and Game Code - FGC (ca.gov)

California Department of Fish and Game. 2012. Staff Report on Burrowing Owl Mitigation.

California Department of Fish and Wildlife (CDFW). 2018. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. Viewed on-line at: http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=18959&inline=1

California Department of Fish and Wildlife (CDFW). 2023a. *State and federally listed Endangered, Threatened, and Rare Plants of California*. Last updated January 2023. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109390&inline (accessed January 2023)

California Department of Fish and Wildlife (CDFW). 2023b. *State and federally listed Endangered and Threatened Animals of California*. Last updated January 2023. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109405&inline (January 2023).

California Department of Fish and Wildlife (CDFW). 2023c. *Species of Special Concern*. https://www.wildlife.ca.gov/Conservation/SSC (accessed January 2023).

California Department of Fish and Wildlife (CDFW). 2023d. List of Vegetation Alliances and Associations. Vegetation Classification and Mapping Program, California Department of Fish and Game. Sacramento, CA. Viewed on line at: https://wildlife.ca.gov/Data/VegCAMP/Natural-Communities (accessed January 2023).

California Department of Fish and Wildlife California Natural Diversity Database (CDFW CNDDB). 2023. Special Animals List. Sacramento, CA. Periodic publication. 99 pp. January 2023.

California Invasive Plant Council (Cal-IPC). 2023. "The Cal-IPC Inventory." [tabular database]. Berkeley, CA. https://www.cal-ipc.org/plants/inventory/ (accessed January 2023).

California Native Plant Society, Santa Cruz Chapter (CNPS-SCC). Undated. Coastal Terrace Prairie. Viewed online at: http://www.cruzcnps.org/CoastalTerracePrairie.html

California Native Plant Society, Rare Plant Program. 2023. Inventory of Rare and Endangered Plants of California (online edition, v9.5). Website http://www.rareplants.cnps.org (accessed 17 May 2023).

California Natural Diversity Database (CNDDB). 2023a. RareFind, Commercial Version 5.2.14, dated January 1, 2023. https://apps.wildlife.ca.gov/rarefind/view/RareFind.aspx (accessed January 2023).

California Natural Diversity Database (CNDDB). 2023b. Biogeographic Information and Observation System (Bios) Commericial Version 5.66.18. https://apps.wildlife.ca.gov/bios6/ (accessed January 2023).

Center for Biological Diversity (CBD), Defenders of Wildlife, California State Park Rangers Association, Santa Clara Valley Audubon Society, San Bernadino Valley Audubon Society, and Tri-County Conservation League. 2003. Petition to the State of California Fish and Game Commission and Supporting Information for Listing the California Population of the Western Burrowing Owl (*Athene cunicularia hypugaea*) as an Endangered or Threatened Species Under the California Endangered Species Act.

Cicero, C., P. Pyle, and M. A. Patten. 2017. Oak Titmouse (*Baeolophus inornatus*), version 3.0. The Birds of North America (P. G. Rodewald, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://birdsna.org/Species-Account/bna/species/oaktit (accessed January 2023).

Cowardin, L. M., V. Carter, F. C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. FWS/OBS-79/31, U.S. Department of Interior, Fish and Wildlife Service, Washington, D.C.

Dunk, J. R. 1995. White-tailed Kite (*Elanus leucurus*), version 2.0. In The Birds of North America (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.178 (accessed January 2023).

eBird. 2023. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. https://ebird.org (accessed January 2023).

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Department of the Army, Waterways Experiment Station, Vicksburg, Mississippi 39180-0631.

Faber-Langendoen D, Nichols J, Master L, Snow K, Tomaino A, Bittman R, Hammerson G, Heidel B, Ramsay L, Teucher A, and Young B. 2012. NatureServe Conservation Status Assessments: Methodology for Assigning Ranks. NatureServe, Arlington, VA.

Federal Register. November 13, 1986. Department of Defense, Corps of Engineers, Department of the Army, 33 CFR Parts 320 through 330, Regulatory Programs of the Corps of Engineers; Final Rule. Vol. 51, No. 219; page 41217.Hickman, J. C. (ed.). 1993. The Jepson manual: higher plants of California. University of California Press, Berkeley, CA.

Feldman, M., 1982. Notes on reproduction in *Clemmys marmorata*. Herpetological Review. 13:10-11.

Fellers, G.M. and P.M. Kleeman. 2007. California red-legged frog (*Rana draytonii*) movement and habitat use: implications for conservation. Journal of Herpetology, 41 (2):276-286.

Harvey, M. J., J. S. Altenbach, and T. L. Best. 1999. Bats of the United States. Arkansas Game and Fish Commission in cooperation with the U.S. Fish and Wildlife Service.

Hickman, J. C. (ed.). 1993. The Jepson manual: higher plants of California. University of California Press, Berkeley, CA.

Hilty, J.A., W.Z Lidicker Jr., A. M. Merenlender. 2006. Corridor Ecology, The Science and Practice of Linking Landscapes for Biodiversity Conservation. Island Press, Washington DC, 323p.

Holland, R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. State of California, the Resource Agency, Department of Fish and Game. October 1986.

Holland, D.C. and R.B. Bury. 1998. *Clemmys marmorata* (Baird and Girard 1852) western pond turtle. *In* P.C.H. Pritchard and A G.J. Rhodin (eds.), The Conservation Biology of Freshwater Turtles. Chelonian Research Monographs 2(2).

Katzner, T. E., M. N. Kochert, K. Steenhof, C. L. McIntyre, E. H. Craig, and T. A. Miller. 2020. Golden Eagle (Aquila chrysaetos), version 2.0. In Birds of the World (P. G. Rodewald and B. K. Keeney, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.goleag.02

Kittleson Environmental Consulting. 2014. California red-legged frogs at the Watsonville Slough Farm: Results of 2013-2014 Field Surveys. Prepared for the Land Trust of Santa Cruz County. June 2014.

Kittleson, G. Kittleson Environmental Consulting. 2023. Personal Communication between G. Kittleson, biologist, and Erin McGinty, EcoSystems West biologist, via phone and email. January 2023.

Land Trust of Santa Cruz County (LTSCC). 2022. Community Harvest Program Statement.

Land Trust of Santa Cruz County (LTSCC). 2023. Wildlife observations on Watsonville Slough Farm.

Laursen, Inger Marie. 2018. Personal communication via phone regarding multiple clutches of white-tailed kite. July 2018.

Meese, R.J. 2017. Results of the 2017 Tricolored Blackbird Statewide Survey. California Department of Fish and Wildlife, Wildlife Branch, Nongame Wildlife Program Report 2017-04, Sacramento, CA. 27 pp. + appendices.

Meese, R.J. 2018. Tricolor Listed as Threatened under CESA. Tricolored Blackbird Portal. University of California, Davis. April 19, 2018. https://tricolor.ice.ucdavis.edu/news (accessed June 2018).

Meese, R. J. and E. C. Beedy. 2015. Managing nesting and foraging habitats to benefit breeding Tricolored Blackbirds. Central Valley Bird Club Bulletin no. 17:79-96.

Mori, B. Bryan Mori Biological Consulting Services. 2018. Personal Communication between B. Mori, biologist, and E. McGinty, EcoSystems West biologist, via phone regarding presence of western pond. April 2018.

Munz, P. A. and D. D. Keck. 1973. A California flora and supplement. University of California Press, Berkeley, CA.

Nafis, G. 2023. California Herps - A Guide to the Amphibians and Reptiles of California. http://www.californiaherps.com/ (accessed January 2023).

Natural Resources Conservation Service (NRCS). 2023a. National Water and Climate Center. United States Department of Agriculture. https://www.wcc.nrcs.usda.gov/climate/navigate_wets.html (accessed January 2023).

Natural Resources Conservation Service (NRCS). 2023b. Web Soil Survey. United States Department of Agriculture. https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx (accessed January 2023).

Ng, J., M. D. Giovanni, M. J. Bechard, J. K. Schmutz, and P. Pyle. 2020. Ferruginous Hawk (Buteo regalis), version 1.0. In Birds of the World (P. G. Rodewald, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.ferhaw.01

Pacific Gas & Electric Company, ICF International, and H. T. Harvey & Associates. 2015. Nesting Bird Management Plan: Biologists Guidelines for PG&E Utility Operations, Maintentance, and Projects. August 2015.

Phillip Q. Spinks, Robert C. Thomson, and H. Bradley Shaffer. 2014. *The advantages of going large: genome wide SNPs clarify the complex population history and systematics of the threatened western pond turtle.* Molecular Ecology. 23(9): 2228-2241. June, 2014.

Poulin, R. G., L. D. Todd, E. A. Haug, B. A. Millsap, and M. S. Martell. 2011. Burrowing Owl (Athene cunicularia), version 2.0. In The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.61 (accessed May 2020).

Quinn, J. 2015. American badgers (*Taxidea taxus*) in California. CDFW Conservation Lecture Series. Habitat Conservation Planning Branch**,** Sacramento, CA. August 6, 2015 (accessed January 2023).

Reis, D. Ecological Studies. 2020. Personal Communication via phone between Dawn Reis, biologist, EcoSystems West biologist, E. McGinty. May 2020.

Rinkert, Alex. 2020. Bird Records, Santa Cruz Bird Club. Personal communication via e-mail regarding wintering burrowing owl, with Erin McGinty, Biologist, EcoSystems West Consulting Group. September 10, 2020.

Rodewald, P.G., Ed. The Birds of North America Online. Ithaca: Cornell Lab of Ornithology.

Ruth, S. B. 1988. The life history and current status of the Santa Cruz long-toed salamander (Ambystoma macrodactylum croceum). In: De Lisle, H.F., P.R. Brown, B. Kaufman, and B.M. McGurty (eds.), Proceedings of the Conference on California herpetology, Southwestern Herpetologists Society, Van Nuys, CA. Special Publication No. 4.

Sakai, H.F. and B.R. Noon, 1993. Dusky-footed woodrat abundance in different-aged forests in Northwest California. Journal of Wildlife Management. Volume 57, pp. 373-381.

Santa Cruz Bird Club. 2013. Checklist of the Birds of Santa Cruz County, California. Prepared by David L. Suddjian. Updated December 28, 2013.

Santa Cruz County. 1994. 1994 General Plan/Local Coastal Program. County of Santa Cruz, CA. Effective Date: December 19, 1994. http://www.sccoplanning.com/PlanningHome /SustainabilityPlanning /GeneralPlan.aspx (accessed June 2018).

Sawyer, J. and T. Keeler-Wolf. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society, Sacramento, California.

Schmalz, David. 2017. Taking Flight. Monterey County Weekly. June 29, 2017. Viewed on-line at: http://www.montereycountyweekly.com/news/local_news/with-the-remarkable-recovery-of-bald-eagles-ventana-wildlife-society/article_dde93a3c-5c36-11e7-af60-d7c0145fff6c.html

Smith, K.G., S.R. Wittenberg, R. B. Macwhirter, and K. L. Bildstein. 2011. Northern Harrier (Circus cyaneus), version 2.0. The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.210 (accessed June 2018).

Stebbins, Robert C., and McGinnis, Samuel M. 2012. Field Guide to Amphibians and Reptiles of California: Revised Edition, (California Natural History Guides) University of California Press.

Steiner, C. 2018. Personal Communication via e-mail regarding California red-legged frogs in the vicinity of the Study Area. August 10, 2018.

State Water Resources Control Board (SWRCB). 2001. Memorandum: Effect of SWANCC V. United States on the 401 Certification Program. [dated January 25, 2001].

State Water Resources Control Board (SWRCB). 2023. Porter-Cologne Water Quality Control Act, Water Code Division 7 and Related Sections (As Amended and Including Statutes 2022). January 2023. 303 pp.

State of California. 1976. California Coastal Act. Prepared by the California State Legislature.

Thomas, J. H. 1961. Flora of the Santa Cruz Mountains of California. Stanford University Press, Stanford, California. 434 pp.

Tibor, D. P. (ed.). 2001. Inventory of rare and endangered vascular plants of California. California Native Plant Society Special Publication No. 1 [6th edition]. California Native Plant Society, Sacramento, CA.

Townsend, S. and C. Lenihan. 2007. Burrowing Owl Status in the Greater San Francisco Bay Area. Proceedings of the California Burrowing Owl Symposium 60-69. © The Institute for Bird Populations 2007.

Trulio, L., D. Chromczak, and P.G. Higgins. 2018. Winter Burrowing Owl Monitoring, 2016-2018, Final Report for the Period February 1, 2016 to March 1, 2018. Prepared for California Department of Fish and Wildlife (CDFW) and San Francisco Bay Bird Observatory.

Trulio, L. Western Burrowing Owl Workshop. July 19-20, 2018. Presented through Elkhorn Slough Coastal Training Program. Materials may be viewed on-line at: http://www.elkhornsloughctp.org/uploads/files/1531766340Burrowing%20Owl%20Workshop%20PPT%202018-min.pdf

U.S. Army Corps of Engineers (USACE). 2008. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Version (Version 2.0)*. Eds. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center. August 2008.

U.S Fish and Wildlife Service (USFWS). 1996. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Red-legged Frog, Final Rule. Federal Register 50 CFR Part 17, Volume 61 No. 101, pp. 25813-25833, May 23, 1996. https://www.gpo.gov/fdsys/pkg/FR-1996-05-23/pdf/96-12901.pdf#page=1

United States Fish and Wildlife Service (USFWS). 1999. Santa Cruz long-toed salamander (Ambystoma macrodactylum croceum) draft revised recovery plan. Prepared for Region 1 U.S. Fish and Wildlife Service.

U.S. Fish and Wildlife Service (USFWS). 2002a. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for *Holocarpha macradenia*. Federal Register Vol. 67, No. 200, November 15, 2002.

U.S. Fish and Wildlife Service (USFWS). 2002b. Recovery Plan for the California red-legged frog (*Rana aurora draytonii*). U. S. Fish and Wildlife Service, Portland, Oregon. vii+173pp.

U.S. Fish and Wildlife Service (USFWS). 2005. Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog. [August 2005].

U.S. Fish and Wildlife Service (USFWS). 2006. Designation of Critical Habitat for the California Red Legged Frog, and Special Rule Exemption Associated With Final Listing for Existing Routine Ranching Activities; Final Rule; Federal Register Vol. 71, No. 71, April 13, 2006.

U.S Fish and Wildlife Service (USFWS). 2010. Revised Designation of Critical Habitat for California Red-Legged Frog; Final Rule. Federal Register Vol. 75, No. 51 March 17, 2010. Viewed online at: http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2010_register&docid=fr17mr10-23

U.S. Fish and Wildlife Service (USFWS). 2023. A system for mapping riparian areas in the western United States. US Fish and Wildlife Services – Ecological Services, Division of Budget and Technical Support, Branch of Geospatial Mapping and Technical Support. Falls Church, VA. https://www.fws.gov/glossary/riparian#:~:text=Riparian%20areas%20are%20plant%20communities,transitional%20between%20wetland%20and%20upland (Accessed January 2023).

U.S. Fish and Wildlife Service (USFWS). 2021. Birds of Conservation Concern 2021. United States Department of Interior, Fish and Wildlife Service, Migratory Birds, Falls Church, VA. Viewed on-line at: https://www.fws.gov/sites/default/files/documents/birds-of-conservation-concern-2021.pdf (Accessed January 2023).

U.S. Fish and Wildlife Service (USFWS). 2023a. Listed species with spatial current range believed to or known to occur in California. Listed Species (fws.gov) (Accessed January 2023).

U.S. Fish and Wildlife Service (USFWS). 2023b. Proposed for Listing species with spatial current range believed to or known to occur in California. Proposed for Listing Species (fws.gov) (accessed January 2023).

U.S. Fish and Wildlife Service (USFWS). 2023c. Candidate for Listing species with spatial current range believed to or known to occur in California. Candidate for Listing Species (fws.gov) (accessed January 2023).

U.S. Fish and Wildlife Service (USFWS). 2023d. National Wetlands Inventory. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. National Wetlands Inventory (usgs.gov) (Accessed January 2023).

U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW). 2003. Interim guidance on site assessment and field studies for determining presence or a negative finding of the California tiger salamander. October 2003.

U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW). 2012. Guidance on site assessment and field studies to determine presence or report a negative finding of the Santa Cruz long-toed salamander. December 2012.

U.S. Geological Survey. 1980. Watsonville West quadrangle. 7.5 minute topographic map.

Watsonville, City of. 1983. Watsonville 2005 Local Coastal Program. Last amended April 14, 1998. CCC Certification of Amendments: October 12, 2000.

Watt, D. J., P. Pyle, M. A. Patten, and J. N. Davis (2016). Lawrence's Goldfinch (Spinus lawrencei), version 3.0. In The Birds of North America (P. G. Rodewald, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.lawgol.03

Western Bat Working Group (WBWG). 2017. Western Bat Species: Regional Priority Matrix. http://wbwg.org/matrices/species-matrix/ (accessed June 2018) and Western Bat Species: Species Accounts. http://wbwg.org/western-bat-species/ (accessed June 2018).

Westphal, M. 2018. Personal Communication via e-mail regarding California red-legged frog in the vicinity of the Study Area. October 15, 2018.

Vickery, P. D. (1996). Grasshopper Sparrow (Ammodramus savannarum), version 2.0. In The Birds of North America (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.239 (accessed January 2023).

Watt, D. J., P. Pyle, M. A. Patten, and J. N. Davis. 2016. Lawrence's Goldfinch (Spinus lawrencei), version 3.0. In The Birds of North America (P. G. Rodewald, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.lawgol.03 (accessed June 2018).

White, C. M., N. J. Clum, T. J. Cade, and W. G. Hunt. 2002. Peregrine Falcon (Falco peregrinus), version 2.0. In The Birds of North America (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.660 (accessed May 2018).

Wiggins, D. A., D. W. Holt, and S. M. Leasure. 2020. Short-eared Owl (Asio flammeus), version 1.0. In Birds of the World (S. M. Billerman, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.sheowl.01

Yosef, R. 1996. Loggerhead Shrike (Lanius ludovicianus), version 2.0. In The Birds of North America (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.231 (accessed January 2023).

Attachment C

Geotechnical Investigation

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GEOTECHNICAL INVESTIGATION

WATSONVILLE SLOUGH FARM
COMMUNITY HARVEST PROJECT
WATSONVILLE, CALIFORNIA

FOR
SSA LANDSCAPE ARCHITECTS
SANTA CRUZ, CALIFORNIA

Pacific Crest
ENGINEERING INC

CONSULTING GEOTECHNICAL ENGINEERS

2219-SZ81-C51
JUNE 2024
www.4pacific-crest.com

June 13, 2024 Project No. 2219-SZ81-C51

Mr. Christian Harris
SSA Landscape Architects
303 Potrero Street, Suite 40-C
Santa Cruz, CA 95060

Subject: **Geotechnical Investigation – Design Phase**
Watsonville Slough Farm
Community Harvest Project
Watsonville, California

Dear Mr. Harris,

In accordance with your authorization, we have performed a geotechnical investigation for the proposed improvements at Watsonville Slough Farm in Watsonville, California.

The accompanying report presents our conclusions and recommendations as well as the results of the geotechnical investigation on which they are based. The conclusions and recommendations presented in this report are contingent upon our review of the plans during the design phase of the project, and our observation and testing during the construction phase of the project.

Very truly yours,

PACIFIC CREST ENGINEERING INC.

Prepared by:

Chris Johnson, PE
Principal Civil Engineer
C 82779
Expires 9/30/24

Reviewed by:

Soma Goresky, GE
Associate Geotechnical Engineer
GE 2252
Expires 6/30/25

TABLE OF CONTENTS

GEOTECHNICAL INVESTIGATION REPORT
Watsonville Slough Farm
Community Harvest Project
Watsonville, California

I. INTRODUCTION

PURPOSE AND SCOPE

This report describes the geotechnical investigation and presents our conclusions and recommendations for the proposed Community Harvest Project in Watsonville, California. For purposes of this report, "site" refers to the 400+ acre Watsonville Slough Farm owned by the Santa Cruz County Land Trust.

Our scope of services for this project has consisted of:

1. Site reconnaissance to observe the existing conditions.
2. Review of the following published maps:
    - Geologic Map of Santa Cruz County, California, Brabb, 1997.
    - Preliminary Map of Landslide Deposits in Santa Cruz County, California, Cooper-Clark and Associates, 1975.
    - Map Showing Geology and Liquefaction Potential of Quaternary Deposits in Santa Cruz County, California, Dupré, 1975.
    - U.S. Geological Survey (and the California Geologic Survey), 2018, Quaternary fault and fold database for the United States, accessed January 2020, from USGS web site: http//earthquake.usgs.gov/hazards/qfaults/.
    - Geographic Information System – Santa Cruz County, "GISWEB Interactive Mapping Application" http://gis.co.santa-cruz.ca.us/internet/wwwgisweb/ viewer.htm
3. The drilling and logging of sixteen (16) exploratory borings and seven (7) infiltration test borings.
4. Infiltration testing of seven (7) test holes in accordance with the Central Coast Low Impact Development Initiative, with procedures outlined in the report titled "Native Soil Assessment For Small Infiltration-Based Storm Water Control Measures". Our infiltration study followed the "Shallow Quick Infiltration Test" method, as described within Attachment 1 of that document.
5. Laboratory analysis of retrieved soil samples.
6. Engineering analysis of the field and laboratory test results.

7. Review of preliminary plans and sections showing the locations of the proposed improvements.

8. Preparation of this report documenting our investigation and presenting geotechnical recommendations for the design and construction of the project.

PROJECT LOCATION

The Watsonville Slough Farm is located on the south side of Harkins Slough Road, immediately south of the intersection with Lee Road in Watsonville, California. There are entrances to the farm property on Harkins Slough Road as well as Lee Road, with the majority of the work being performed at the 275 Lee Road entrance. Please refer to Figure No. 1, Regional Site Map, for the general vicinity of the site. Furthermore, the site is located at the following coordinates:

Latitude = 36.906403 degrees
Longitude = -121.789394 degrees

PROPOSED IMPROVEMENTS

Based on our review of preliminary plans and discussions with the design team, it is our understanding that the primary objective of the project is to provide public access and involvement to the commercial agricultural property.

Improvements to the property accessed from the Lee Road entrance will include

- Improvements to the entry gate
- Removal and replacement of the approximately 4,600 square foot barn structure.
- New restroom facilities
- A 53-stall asphalt parking lot and driveway improvements.
- Walking trails
- Covered and uncovered picnic areas
- 53,000-gallon water storage tank
- Improvements to the caretaker trailer parking area.
- Elevated boardwalks traversing the slough
- Elevated slough observation platforms
- Bioswale/infiltration facilities
- Associated underground utilities

Improvements to the property accessed from the Harkin Slough Road entrance will include

- Realignment of the existing entry road, and new entry gate
- Elevated slough observation platforms
- New caretaker trailer parking area
- Bioswale/infiltration facilities
- Associated underground utilities

PREVIOUS INVESTIGATIONS

To date, Pacific Crest Engineering, Inc. has completed the following report(s) on the site:

- Pacific Crest Engineering, Inc. *Geotechnical Investigation for Hanson Slough Boardwalks*, Project No. 19141-SZ81-C42, October 6, 2020

The above referenced geotechnical investigation included the advancement of four (4) exploratory borings at the abutments of the two proposed boardwalk slough crossings. Please refer to Figure No. 2, Appendix A of the previous report for the general locations of these borings (shown in red). Additionally, two helical anchors were advanced and tested within the slough as close to the center as feasibly possible. The individual boring logs from the referenced investigations are included within Appendix B of this report.

II. INVESTIGATION METHODS

FIELD INVESTIGATION

Sixteen (16) exploratory borings and seven (7) infiltration test borings were drilled at the site on April 1st & 3rd, 2024. The approximate locations of the test borings are shown on Figure No. 2, through Figure No. 4, in Appendix A. The drilling method used was hydraulically operated continuous flight augers on a truck or tractor mounted drill rig. An engineer and/or geologist from Pacific Crest Engineering Inc. was present during the drilling operations to log the soil encountered and to choose sampler type and locations.

Relatively undisturbed soil samples were obtained at various depths by driving a split spoon sampler 18 inches into the ground. This was achieved by dropping a 140-pound hammer a vertical height of 30 inches. The hammer was actuated with a wire winch. The number of blows required to drive the sampler each 6-inch increment and the total number of blows required to drive the last 12 inches was recorded by the field engineer/geologist. The outside diameter of the samplers used was 3-inch or 2-inch and is designated on the Boring Logs as “L” or “T”, respectively.

The field blow counts in 6-inch increments are reported on the Boring Logs adjacent to each sample as well as the Standard Penetration Test data (SPT). All SPT data has been normalized to a 2-inch O.D. sampler and is reported on the Boring Logs as SPT "N" values. The normalization method used was derived from the second edition of the Foundation Engineering Handbook (H.Y. Fang, 1991). The method utilizes a Sampler Hammer Ratio which is dependent on the weight of the hammer, height of hammer drop, outside diameter of sampler, and inside diameter of sample.

The soils encountered in the borings were continuously logged in the field and visually described in accordance with the Unified Soil Classification System (ASTM D2488) as described in the Boring Log Explanation, Figures No. 3 and 4, in Appendix A. The soil classification was verified upon completion of laboratory testing in accordance with ASTM D2487.

Appendix A contains the site plan showing the locations of the test borings, our borings logs and an explanation of the soil classification system used. Stratification lines on the boring logs are approximate as the actual transition between soil types may be gradual.

INFILTRATION TESTING

An Infiltration test boring was advanced within each of the seven (7) proposed infiltration areas as identified by the client. The general locations of the infiltration tests are illustrated on Figure No. 2, through Figure No. 4 in Appendix A of this report. The infiltration test borings were advanced to depths of 0 to 2 feet below the invert elevation of the proposed stormwater infiltration feature (approximately 5 feet below the existing ground surface elevation), as specified by the "Native Soil Assessment For Small Infiltration-Based Storm water Control Measures" test procedure. Proposed invert elevations were assumed based on our experience with similar features.

All infiltration test holes were drilled using a truck or tractor-mounted drill rig equipped with 6-inch diameter solid flight augers. An engineer and/or geologist from Pacific Crest Engineering Inc. were present during the drilling operations to log the soil encountered and to verify the infiltration test depths. Approximately 1 to 2 inches of clean crushed ½-inch diameter gravel was placed at the bottom of each boring. A 4-inch diameter perforated pipe was then placed within each test hole, and the annular space backfilled with gravel. The test holes were presoaked for approximately 24 hours prior to infiltration testing.

The infiltration tests were performed in accordance with the Central Coast Low Impact Development Initiative, with procedures outlined in the report titled "Native Soil Assessment For Small Infiltration-Based Storm Water Control Measures". Our infiltration study followed the "Shallow Quick Infiltration Test" method, as described within Attachment 1 of the above referenced document. This procedure is generally described as follows:

1. At the commencement of each test, the water level within the infiltration test boring was adjusted to the top of the test zone (approximately 2 feet above the bottom of the boring). This was accomplished by using graduated cylinders, allowing the volume of water placed within the test boring to be recorded.
2. The water level within each test boring was maintained at a constant head for the initial 30 minutes of the test. The volume of water required to maintain the constant head was recorded.
3. Following the initial 30-minute constant head period, the water elevation was allowed to fall. This portion of the test was continued for a minimum of 2 hours, with water elevation readings being taken every 2 to 30 minutes contingent on the infiltration rate. The difference in water elevation was then used to compute the infiltration rate at each time interval.
4. If the test boring were to run out of water during the 2-hour test, it would be refilled to the initial elevation. If the infiltration rate was such that the test boring was to run dry following 2 refills (not including the initial fill-up), then the test was concluded.

5. If the drop-in elevation at any time was less than 6 inches in 2 hours, or if the readings were not stable at the end of the 2-hour test, then the test was continued for an additional 2-hour interval (4 hours total).
6. The final infiltration rate was defined as the average infiltration rate during the last time interval. The last time interval is considered to be the last refill cycle or the last 2 hours of a 4-hour test. All final infiltration rates (I_t) are calculated in (in^3/in^2)/hr. or (in/hr.). The factored infiltration rate (k_f), which includes a factor of safety of 2, was also calculated from the final interval.

A summary of the infiltration test results is provided below. The complete infiltration test sheets are provided within Appendix C of this report.

LABORATORY TESTING

The laboratory testing program was developed to aid in evaluating the engineering properties of the materials encountered at the site. Laboratory tests performed include:

- Moisture Density relationships in accordance with ASTM D2937.
- Field penetrometer testing to approximate unconfined compressive strength.
- Gradation testing in accordance with ASTM D1140.
- Atterberg Limits testing in accordance with ASTM D4318.
- Expansion Index testing in accordance with ASTM D4829.
- Unconfined Compression testing in accordance with ASTM D2166.
- "R" Value testing in accordance with California 301.
- Corrosivity testing in accordance with California 643 (Minimum Resistivity), California 422 (Chlorides), California 417 (Sulfates) and California 643 (pH).

The results of the laboratory testing are presented on the boring logs opposite the sample tested and/or presented graphically in Appendix A.

III. FINDINGS AND ANALYSIS

GEOLOGIC SETTING

The surficial geology within the project area is generally mapped as Terrace Deposits with areas of Basin Deposits where Hanson Slough currently occupies or historically extended into the property (Brabb, 1997). The Terrace Deposits generally consist of moderately to well graded silt, silty clay, sand and gravel. These heterogeneous soils are generally weakly consolidated to semi-consolidated. The Basin Deposits generally consist of silty clay and clay rich in organic material. Locally, these soils are known to include thin interbedded layers of silt and silty sand. These predominately plastic soils are generally unconsolidated. The native soils encountered in the test borings are consistent with these descriptions.

SURFACE CONDITIONS

The community harvest project site is located withing an active commercial farm. The property is bordered by Harkin Slough on the west, Hanson Slough to the south, Harkin Slough Road to the north and Lee Road to the east.

The entire multi parcel farm site is generally flat to gently sloping with the topography rarely exceeding 4:1 (H:V) in slope. All the proposed improvements, with the exception of access roadways are generally proposed on the flat portions of the project site. The site generally slopes down toward the sloughs, with localized rolling hills throughout the 400+ acre site.

Surficial improvements to the site are limited. Existing improvements include paved/unpaved access roads, barns, sheds, water tanks, water lines, electrical lines, and other improvements consistent with operating a commercial farm.

SUBSURFACE CONDITIONS

Our subsurface exploration consisted of sixteen (16) exploratory borings and seven (7) infiltration test borings drilled as close to the proposed improvement areas as possible. The borings extended up to 21 ½ feet below existing grades. The soil profiles and classifications, laboratory test results and groundwater conditions encountered for each test boring are presented in the Logs of Test Borings, in Appendix A. The general subsurface conditions are described below.

The majority of borings on the site were advanced within material consistent with Terrace Deposits. These deposits were generally described as interbedded layers of sandy clay, clayey sand, clay, clay sand with sand, and sand with clay. The sand within these borings was predominantly poorly graded and very fine to fine grained and generally described as medium dense to very dense. The clay soils were found to generally have intermediate to high plasticity, which typically corresponds to moderate to high expansive potential. The clay material in these areas were generally described as firm to hard in consistency.

Please refer the Logs of Test Borings in Appendix A and Appendix B, for a more detailed description of the subsurface conditions encountered in each of our test borings at the subject site.

GROUNDWATER CONDITIONS

Groundwater was generally not encountered within the borings to the maximum explored depth of 21½ below existing grades. It should be noted that groundwater was encountered within borings B-2, B-7, and B-8 at depths ranging from 3 to 5 feet below ground surface. We interpret the groundwater encountered in these borings to be perched groundwater as these borings were advanced soon after the winter rains. The groundwater conditions described in this report reflect the conditions encountered relative to the respective drill date at the specific locations drilled. It must be anticipated that the perched and regional groundwater tables may vary with location and could fluctuate with variations in rainfall, runoff, irrigation and other changes to the conditions existing at the time our measurements were made.

Please refer the Logs of Test Borings in Appendix A and Appendix B, for a more detailed description of the groundwater conditions encountered in each of our test borings at the subject site.

STORM WATER INFILTRATION

A summary of the infiltration test results is provided below. The complete infiltration test sheets are provided within Appendix C of this report.

Table No. 1 – Summary of Infiltration Test Results

Test No.	Depth of Test Zone Below Existing Grade (ft.)	Soil Type within Test Zone	Soil Gradation			Infiltration Rate, I_t (in/hr.)	Factored Infiltration Rate, K_f (in/hr.)
			Gravel (%)	Sand (%)	Fines (%)		
P1	3.0 – 5.0	Sandy Clay (Cl)	0.0	29.4	70.6	0.80	0.40
P2	3.0 – 5.0	Poorly Graded Sand (SP)	--	--	--	55.11	27.56[1]
P3	3.0 – 5.0	Clayey Sand (SC)	1.1	62.0	36.9	0.54	0.27
P4	3.0 – 5.0	Fat Clay with Sand (CH)	0.0	6.8	91.2	0.00	0.00
P5	3.0 – 5.0	Sandy Fat Clay (CH)	0.7	26.3	73.0	0.00	0.00
P6	3.0 – 5.0	Sandy Fat Clay (CH)	0.0	42.6	59.6	0.00	0.00
P7	3.0 – 5.0	Sandy Fat Clay (CH)	0.0	22.0	78.0	0.00	0.00

Note 1: P2 encountered a layer of clean sand that we did not encounter within any of the other borings. This sand layer may not be native to the site and the horizontal extents of this layer are unknown. We do not recommend the use of P2 infiltration rates in the design of storm water management features.

SOIL CORROSIVITY

In order to address the corrosivity potential at the subject site, testing was performed on two (2) samples of the on-site soils likely to come in contact with concrete and buried metallic structures. The results are summarized as follows:

TABLE No. 2 - Corrosivity Test Summary

Sample	Approximate Sample Depth (ft)	Soil Resistivity	Chloride	Sulfate (water soluble)	pH
		Ohm-cm	mg/kg	mg/kg	
10-2	2½ to 4	1344	10	51	9.0
5-2	2½ to 4	738	91	311	8.5
14-2	2½ to 4	754	128	231	8.2

According to the Cal Trans Corrosion Guidelines, Version 3.2 (March 2021), a site may be considered corrosive to foundation elements if one or more of the following conditions exist:

- The soil resistivity is *less than* 1,100 ohm-cm
- Chloride concentration is *greater than* or equal to 500 mg/Kg (ppm)
- Sulfate concentration is *greater than* or equal to 1500 mg/Kg (ppm)
- The soil pH is 5.5 *or less*

Furthermore, According to Pacific Gas and Electric (PG&E) Electric & Gas Service Requirements (TD-7001M) 2020-2021, a site may be considered corrosive if one or more of the following conditions exist:

- The soil resistivity is less than 3,000 ohm-cm
- The soil pH is less than 4.5 or greater than 9

In comparing the test results to the threshold values, we have determined that the soils likely to be in contact with concrete and buried metallic structures are potentially corrosive. The corrosion potential for any imported select fill should also be tested for corrosivity. Please refer to Appendix A for a site plan that shows the corrosivity test locations and specific results of the corrosivity testing by the analytical laboratory.

FAULTING AND SEISMICITY

Faulting

Mapped faults which have the potential to generate earthquakes that could significantly affect the subject site are listed in Table No. 3. The fault distances are approximate distances based on the U.S. Geological Survey and California Geological Survey, Quaternary fault and fold database, accessed in May 2024 from the USGS website (https://www.usgs.gov/natural-hazards/earthquake-hazards/hazards) and overlaid onto Google Earth.

Table No. 3 - Distance to Significant Faults

Fault Name	Distance (miles)	Direction
Zayante-Vergeles	3	Northeast
San Andreas	6	Northeast
Sargent	9	Northeast
Monterey Bay-Tularcitos	7.5	Southwest
San Gregorio	21	Southwest

Seismic Shaking and CBC Design Parameters

Due to the proximity of the site to active and potentially active faults, it is reasonable to assume the site will experience high intensity ground shaking during the lifetime of the project. Structures founded on thick, soft soil deposits are more likely to experience more destructive shaking, with higher amplitude and lower frequency, than structures founded on bedrock. Generally, shaking will be more intense closer to earthquake epicenters. Thick, soft soil deposits large distances from earthquake epicenters, however, may result in seismic accelerations significantly greater than expected in bedrock.

Selection of seismic design parameters should be determined by the project structural designer. The site coefficients and seismic ground motion values shown in the table below were developed based on CBC 2022 incorporating the ASCE 7-16 standard, and the project site location.

Table No. 4 - 2022 CBC Seismic Design Parameters [1, 2]

Seismic Design Parameter	ASCE 7-16 Values
Site Class	D
Spectral Acceleration for Short Periods	Ss = 2.283g
Spectral Acceleration for 1-second Period	S_1 = 0.863g
Short Period Site Coefficient	Fa = 1.2
1-Second Period Site Coefficient	Fv = 1.467[2]
MCE Spectral Response Acceleration for Short Period	S_{MS} = 2.74g
MCE Spectral Response Acceleration for 1-Second Period	S_{M1} = 1.899g[2]
Design Spectral Response Acceleration for Short Period	S_{DS} = 1.826g
Design Spectral Response Acceleration for 1-Second Period	S_{D1} = 1.266g[2]

Note 1: Design values have been obtained by using the ASCE Hazard Tool at https://asce7hazardtool.online

Note 2: Per Section 11.4.8 of ASCE 7-16, a ground motion hazard analysis is required for Site Class D sites with S_1 greater than or equal to 0.2. The values provided in this table assume that the value of the seismic response coefficient Cs can be determined by the structural engineer based on the Exceptions as detailed in Section 11.4.8 of ASCE 7-16. This should be verified by the structural designer and Pacific Crest Engineering, Inc. should be contacted for revised Table 5 parameters if these Exceptions are not applicable to the project.

The recommendations of this report are intended to reduce the potential for structural damage to an acceptable risk level, however strong seismic shaking could result in damage and the need for post-earthquake repairs. It should be assumed that exterior improvements such as pavements or sidewalks may need to be repaired or replaced following strong seismic shaking.

GEOTECHNICAL HAZARDS

A quantitative analysis of geotechnical hazards was beyond our scope of services for this project. In general, however, the geotechnical hazards associated with the project site include seismic shaking (discussed above), ground surface fault rupture, liquefaction, lateral spreading, landsliding and expansive soils. A discussion of these hazards is presented below.

Ground Surface Fault Rupture

Pacific Crest Engineering Inc. has not performed a specific investigation for the presence of active faults at the project site. Based upon our review of the Santa Cruz County GIS Hazard Maps, the project site is not mapped within a fault hazard zone.

Ground surface fault rupture typically occurs along the surficial traces of active faults during significant seismic events. Since the nearest known active, or potentially active fault trace is mapped approximately 3 miles from the site, it is our opinion that the potential for ground surface fault rupture to occur at the site should be considered low.

Liquefaction

Based upon our review of the regional geologic hazard maps, the Basin Deposits that underlay the portions of the existing and historic slough are mapped as having a very high liquefaction potential. The Terrace Deposits that underlie the majority of the development areas, where improvements are proposed, are mapped as exhibiting low liquefaction potential.

Liquefaction tends to occur in loose, saturated fine-grained sands, coarse silts or clays with a low plasticity. In order for liquefaction to occur there must be the proper soil type, soil saturation, and cyclic accelerations of sufficient magnitude to densify the soils and progressively increase the water pressures within the soil mass. Non-cohesive soil shear strength is developed by the point to point contact of the soil grains. With sufficient shaking loose cohesionless soils tend to densify, increasing the water pressures in the void spaces surrounding the soil grains until the soil particles become supported more by the water than the point-to-point contact. When the water pressures increase sufficiently, the soil grains begin to lose contact with each other resulting in the loss of shear strength and continuous deformation of the soil where the soil appears to liquefy.

The results of our investigations found the majority of soils we encountered underneath proposed improvements were non-liquefiable, fine-grained clays. Therefore, it is our opinion that there is a low probability that liquefaction will occur and negatively impact the proposed improvements to the site.

Lateral Spreading

Liquefaction induced lateral spreading occurs when a liquefied soil mass fails toward an open slope face or fails on an inclined topographic slope. Our qualitative liquefaction analysis indicates that the areas that are to receive improvements have a low potential for liquefaction, consequently the potential for lateral spreading is also considered low in these areas.

Landsliding

The subject site and immediate vicinity are relatively flat to gently sloping. It is our opinion that the potential for shallow landsliding to occur and adversely affect the proposed development should be considered negligible.

Slope failures can occur where surface drainage is allowed to concentrate onto unprotected slopes. Appropriate landscaping and good control of surface drainage around the project area becomes very important to reduce potential for shallow slumping of slopes. Erosion control measures should be implemented and maintained. Under no circumstances should surface runoff be directed toward, or discharged upon, any topographic slopes.

Expansive Soils

The subject site is underlain by varying layers of intermediate to highly expansive clays. Expansive soils tend to heave during the rainy season and contract during the summer and this shrink/swell action extends down to the depth of seasonal moisture change. When this cyclical volume change occurs on sloping ground it results in "soil creep" due to the downward vector of the shrink/swell action. Seasonal moisture fluctuation and subsequent expansion and contraction of these types of soils typically occurs more near the ground surface where the seasonal moisture fluctuation is the greatest and decreases with depth below ground surface.

IV. DISCUSSION AND CONCLUSIONS

GENERAL

1. The results of our investigation indicate that the proposed improvements are feasible from a geotechnical engineering standpoint, provided our recommendations are included in the design and construction of the project.

2. Grading and foundation plans should be reviewed by Pacific Crest Engineering Inc. during their preparation and prior to contract bidding.

3. Pacific Crest Engineering Inc. should be notified at least four (4) working days prior to any site clearing and grading operations on the property in order to observe the stripping and disposal of unsuitable materials, and to coordinate this work with the grading contractor. During this period, a pre-construction conference should be held on the site, with at least the client or their representative, the grading contractor, a City representative and one of our engineers present. At this meeting, the project specifications and the testing and inspection responsibilities will be outlined and discussed.

4. The findings, conclusions and recommendations provided in this report are based on the understanding that Pacific Crest Engineering will remain as Geotechnical Engineer of Record throughout the design and construction phase of the project. The validity of the findings, conclusions and recommendations contained in this report are dependent upon our review of project plans as well as an adequate testing and observation program during the construction phase. Field observation and testing must therefore be provided by a representative of Pacific Crest Engineering Inc., to enable us to form an opinion as to whether the extent of work related to earthwork or foundation excavation complies with the project plans, specifications and our geotechnical recommendations. Pacific Crest Engineering assumes no responsibility for any site work that is performed without the full knowledge and direct observation of Pacific Crest Engineering Inc.

PRIMARY GEOTECHNICAL CONSIDERATIONS

5. Based upon the results of our investigation, it is our opinion that the primary geotechnical issues associated with the design and construction of the proposed project are the following:

a. Expansive Soils: The native clay soils underlying the proposed improvements exhibit intermediate to high expansive potential. Seasonal shrinking and swelling of these soils could result in heave or settlement and damage to improvements. To reduce this potential, we recommend that foundations and concrete flatwork be underlain by non-expansive engineered fill. Refer to the Earthwork, and Foundations sections of this report for details.

b. *Remnant Effects of Demolition Operation:* The initial preparation of the site will include the demolition of the existing barn structure and associated foundation elements. As a result of these activities, it is likely that the upper 2 to 3 feet of surficial soil in this area will be highly disturbed. These soils will need to be sub-excavated and recompacted as engineered fill. Refer to the Site Preparation section of this report for recommendations.

c. Strong Seismic Shaking: The project site is located within a seismically active area and strong seismic shaking is expected to occur within the design lifetime of the project. Improvements should be designed and constructed in accordance with the most current CBC and the recommendations of this report to minimize reaction to seismic shaking. Structures built in accordance with the latest edition of the California Building Code have an increased potential for experiencing relatively minor damage which should be repairable, however strong seismic shaking could result in damage and the need for post-earthquake repairs.

V. RECOMMENDATIONS

EARTHWORK

Clearing and Stripping

1. The initial preparation of the site may consist of demolition of portions of any existing flatwork and removal of designated trees and debris. All flatwork and any encountered foundation elements must be completely removed from the development areas. Tree removal should include the entire stump and root ball. Septic tanks and leaching lines, if found, must be completely removed. The extent of this soil removal will be designated by a representative of Pacific Crest Engineering Inc. in the field. This material must be removed from the site.

2. Any voids created by the removal of flatwork, foundations, tree and root balls, septic tanks, and leach lines must be backfilled with properly compacted engineered fill which meets the requirements of this report.

3. Any wells encountered shall be capped in accordance with the requirements and approval of the County Health Department. The strength of the cap shall be equal to the adjacent soil and shall not be located within 5 feet of a structural footing.

4. Surface vegetation, tree roots and organically contaminated topsoil should then be removed ("stripped") from the area to be graded. In addition, any remaining debris or large rocks must also be removed (this includes asphalt or rocks greater than 2 inches in greatest dimension). This material may be stockpiled for future landscaping.

5. It is anticipated that the depth of stripping may be 2 to 4 inches. Final required depth of stripping must be based upon visual observations by a representative of Pacific Crest Engineering Inc., in the field. The required depth of stripping will vary based upon the type and density of vegetation across the project site and with the time of year.

Subgrade Preparation

6. As noted above, demolition of the existing barn may result in the disturbance of the upper 2 to 3 feet of soil. Areas disturbed by the demolition process, will need to be completely excavated to undisturbed native material. The excavation process should be observed, and the extent designated by a representative of Pacific Crest Engineering Inc., in the field. Any voids created by fill removal must be backfilled with properly compacted engineered fill.

7. After clearing and stripping are completed the following subexcavation depths are recommended:

Shallow foundations: 18 inches below bottom of footing
Interior slab-on-grade floors: 18 inches below capillary break
Exterior concrete flatwork, curbs and gutters: 12 inches below bottom of concrete
Vehicular pavements and parking areas: no over-excavation required

8. Subexcavations should extend at least 5 feet horizontally beyond structural foundations and at least 18 inches horizontally beyond exterior flatwork, curbs and gutters. Final depth of subexcavation should be determined by a representative of Pacific Crest Engineering Inc., in the field.

9. Following clearing, stripping and any necessary subexcavations, the exposed subgrade soil that is to support (concrete slabs-on-grade, foundations, pavements) should then be scarified 8 inches, and the soil moisture conditioned and compacted as outlined below.

10. Wet and/or unstable soils may be encountered at the bottom of the excavations. If wet and/or unstable subgrades are encountered, they may need to further subexcavated and replaced with stabilization fabric, crushed rock or other materials to create a stable working surface. The depth of over-excavations and method used should be determined in the field at the time of construction. All subexcavations should be observed by a representative of Pacific Crest Engineering Inc. and modified as necessary to establish a stable subgrade.

Material for Engineered Fill

11. As noted above, a significant portion of the native surficial soils are highly expansive. Expansive native soils are not suitable as engineered fill within the subexcavations noted above. Therefore, we recommend the following options be considered:

a. Segregate expansive and non-expansive material under the oversight of Pacific Crest Engineering, Inc. This option will likely require the import and off haul of some material; however, we are unable to quantify import and off haul quantities.

b. Remove expansive native material and import non-expansive fill to provide the non-expansive sections described in this report.

c. Chemically treat the native material with lime (Calcium Oxide) to reduce the expansive potential of the soil. Our office should be contacted for additional recommendations if this option is selected.

12. Native or imported soil proposed for use as engineered fill should meet the following requirements:

a. free of organics, debris, and other deleterious materials,
b. free of "recycled" materials such as asphaltic concrete, concrete, brick, etc.,
c. granular in nature, well graded, and contain sufficient binder to allow utility trenches to stand open,
d. free of rocks in excess of 2 inches in size,
e. Plasticity Index between 4 and 12, and
f. non-expansive.

13. Samples of any proposed imported fill planned for use on this project should be submitted to Pacific Crest Engineering Inc. for appropriate testing and approval not less than ten (10) working days before the anticipated jobsite delivery. This includes proposed import trench sand, drain rock and for aggregate base materials. Imported fill material delivered to the project site without prior submittal of samples for appropriate testing and approval must be removed from the project site.

Engineered Fill Placement and Compaction

14. Following any necessary subexcavations and/or subgrade preparation, areas should be brought up to design grades with engineered fill that is moisture conditioned and compacted according to the recommendations of this report. *This should result in a minimum of 18 inches of engineered fill beneath all new footings and slab-on-grade floors, and 12 inches beneath new concrete flatwork, curbs and gutters.* Recompacted sections should extend at least 5 feet horizontally beyond all footings, slabs and 18 inches beyond the edges of flatwork and pavement areas, where possible.

15. Requirements for pre-wetting of the footing excavations prior to pouring foundations will depend on the specific soils and seasonal moisture conditions and will be determined by a representative of Pacific Crest Engineering Inc. at the time of construction. It is important that the subgrade soils be properly moisture conditioned and not be allowed to dry out before the concrete is poured.

16. Engineered fill should be placed in maximum 8-inch lifts, before compaction, at a water content which is within 1 to 3 percent of the laboratory optimum value. Expansive subgrade soils should be moisture conditioned to between 3 to 5 percent above the laboratory optimum.

17. The soil on the project site should be compacted as follows:

a. In pavement areas the upper 8 inches of subgrade, and all aggregate subbase and aggregate base, should be compacted to a minimum of 95% of its maximum dry density,

b. In pavement areas all utility trench backfill should be compacted to 95% of its maximum dry density,

c. All remaining soil on the project site should be compacted to a minimum of 90% of its maximum dry density.

18. The maximum dry density will be obtained from a laboratory compaction curve run in accordance with ASTM Procedure #D1557. This test will also establish the optimum moisture content of the material. Field density testing will be performed in accordance with ASTM Test #D6938 (nuclear method).

19. We recommend field density testing be performed in maximum 2-foot elevation differences. In general terms, we recommend at least one compaction test per 200 linear feet of utility trench or retaining wall backfill, and at least one compaction test per 2,000 square feet of building or structure area. This is a subjective value and may be changed by the geotechnical engineer based on a review of the final project layout and exposed field conditions.

20. Engineered fill placed on existing slopes that are steeper than 5:1 (horizontal:vertical) should be keyed and benched into competent native material. Toe keys should be constructed at the base of the fill slope with a minimum 10 foot wide width and sloped negatively at least 2% into the bank. The depth of the keyways will vary, depending on the materials encountered. It is anticipated that the depth of the keyways may be 2 to 4 feet.

21. Subsequent benches may be required as the fill section progresses upslope. Benches and keys will be designated in the field by a representative of Pacific Crest Engineering Inc. See Figure No. 30 in Appendix A for general details.

Cut and Fill Slopes

22. Fill slopes should be constructed with engineered fill meeting the minimum density requirements of this report and have a gradient no steeper than 3:1 (H:V). Fill slopes should not exceed 15 feet in vertical height unless specifically reviewed by Pacific Crest Engineering Inc. Where the vertical height exceeds 15 feet, intermediate benches must be provided. These benches should be at least 6 feet wide and sloped to control surface drainage. A lined ditch should be used on the bench.

23. Permanent cut slopes in soil shall not exceed a 3:1 (H:V) gradient. All cut slopes should not exceed a 15-foot vertical height unless specifically reviewed by a representative of Pacific Crest Engineering Inc. Where the vertical height exceeds 15 feet, intermediate benches must be provided. These benches should be at least 6 feet wide and sloped to control surface drainage. A lined ditch should be used on the bench.

24. The above slope gradients are based on the strength characteristics of the materials under conditions of normal moisture content that would result from rainfall falling directly on the slope, and do not take into account the additional activating forces applied by seepage from spring areas or subsurface groundwater. Therefore, in order to maintain stable slopes at the recommended gradients, it is important that any seepage forces and accompanying hydrostatic pressure (if encountered) be relieved by adequate drainage. Drainage facilities may include subdrains, gravel blankets, rock fill surface trenches or horizontally drilled drains. Configurations and type of drainage will be determined by a representative of Pacific Crest Engineering Inc. during the grading operations.

25. The above recommended gradients do not preclude periodic maintenance of the slopes, as minor sloughing and erosion may take place.

26. If a fill slope is to be placed above a cut slope, the toe of the fill slope should be set back at least 8 feet horizontally from the top of the cut slope. A lateral surface drain should be placed in the area between the cut and fill slopes.

27. All flatwork, pavement, curbs and gutters should be set back at least 3 feet horizontally from the crown of any slope. All foundations should be set back at least 10 feet horizontally from the top of cut/fill slope and bottom of a cut slope.

Soil Moisture and Weather Conditions

28. If earthwork activities are done during or soon after the rainy season, the on-site soils and other materials may be too wet in their existing condition to be used as engineered fill. These materials may require a diligent and active drying and/or mixing operation to reduce the moisture content to the levels required to obtain adequate compaction as an engineered fill. If the on-site soils or other materials are too dry, water may need to be added. In some cases, the time and effort to dry the on-site soil may be considered excessive, and the import of engineered fill material may be required.

Utility Trench Backfill

29. Utility trenches that are parallel to the sides of the building should be placed so that they do not extend below a line sloping down and away at a 2:1 (horizontal to vertical) slope from the bottom outside edge of all footings.

30. Utility pipes should be designed and constructed so that the top of pipe is a minimum of 24 inches below the finish subgrade elevation of any road or pavement areas. Any pipes within the top 24 inches of finish subgrade should be concrete encased, per design by the project civil engineer.

31. For the purpose of this section of the report, backfill is defined as material placed in a trench starting one foot above the pipe, and bedding is all material placed in a trench below the backfill.

32. Unless concrete bedding is required around utility pipes, free-draining clean sand should be used as bedding. Sand bedding should be compacted to at least 95 percent relative compaction. Clean sand is defined as 100 percent passing the #4 sieve, and less than 5 percent passing the #200 sieve.

33. Approved imported clean sand or native soil should be used as utility trench backfill. Backfill in trenches located under and adjacent to structural fill, foundations, concrete slabs and pavements should be placed in horizontal layers no more than 8 inches thick. This includes areas such as sidewalks, patios, and other hardscape areas. Each layer of trench backfill should be moisture conditioned and compacted to at least 95 percent relative compaction

34. All utility trenches beneath perimeter footing should be backfilled with controlled density fill (such as 2-sack sand\cement slurry) to help minimize potential moisture intrusion below interior floors. The length of the plug should be at least three times the width of the footing or grade beam at the building perimeter, but not less than 36 inches. A representative from Pacific Crest Engineering Inc. should be contacted to observe the placement of slurry plugs. In addition, all utility pipes which penetrate through the footings, stemwalls or grade beams (below the exterior soil grade) should also be sealed water-tight, as determined by the project civil engineer or architect.

35. Utility trenches which carry "nested" conduits (stacked vertically) should be backfilled with a control density fill (such as 2-sack sand\cement slurry) to an elevation one foot above the nested conduit stack. The use of pea gravel or clean sand as backfill within a zone of nested conduits is not recommended.

36. A representative from our firm should be present to observe the bottom of all trench excavations, prior to placement of utility pipes and conduits. In addition, we should observe the condition of the trench prior to placement of sand bedding, and to observe compaction of the sand bedding, in addition to any backfill planned above the bedding zone.

37. Jetting of the trench backfill is not recommended as it may result in an unsatisfactory compaction.

38. Trenches must be shored as required by the local agency and the State of California Division of Industrial Safety construction safety orders.

<u>Excavations and Shoring</u>

39. It should be understood that on-site safety is the *sole responsibility* of the Contractor, and that the Contractor shall designate a *competent person* (as defined by CAL-OSHA) to monitor excavations prior to the start of each work day, and throughout the work day as conditions change. The competent person designated by the Contractor shall determine if flatter slope gradients are more appropriate, or if

shoring should be installed to protect workers in the vicinity of the slope excavation. Refer to Title 8, California Code of Regulations, Sections 1539-1543.

40. All excavations must meet the requirements of 29 CFR 1926.651 and 1926.652 or comparable OSHA approved state plan requirements.
41. The "top" of any temporary cut slope and excavations should be set-back at least ten feet (measured horizontally) from any nearby structure or property line. Any excavations which cannot meet this requirement will need to have a shoring system designed to support steeper gradients.

42. Temporary shoring is not currently anticipated for this project. Should these requirements change, please contact our office for additional recommendations.

FOUNDATIONS – SPREAD FOOTINGS – BARN AND MINOR STRUCTURES

43. At the time we prepared this report, foundation and grading plans had not been completed. We request an opportunity to review these items during the design stages to determine if supplemental recommendations will be required.

44. Based upon the results of our investigation, we recommend that the proposed barn and other minor structures be founded on spread footing foundations bearing upon non-expansive engineered fill as specified in the preceding sections of this report. This system should consist of continuous exterior footings, in conjunction with interior spread footings that are connected with grade beams. No isolated footings should be constructed.

45. All interior foundations should be tied together and connected to the perimeter by grade beams so that the foundation acts as a structural unit. Grade beams should be at least 12 inches in height and reinforced with a minimum of one #4 bar, top and bottom. Actual size and footing reinforcing should be determined by the project structural engineer.

46. All footings must be trenched at least 18 inches below lowest adjacent compacted pad grade.

47. No footings shall be constructed with the intent of placing engineered fill against the footing after the footing is poured and counting that engineered fill as part of the embedment depth of the footing.

48. Footings constructed to the criteria above may be designed using the following parameters: bearing capacities:

a. Allowable bearing capacity = 1,500 psf for dead plus live loading with a 1/3rd increase for seismic or wind loading
b. Frictional coefficient between foundations and underlying soil subgrade = 0.30
c. Ultimate passive resistance = 300 pounds per cubic foot

49. Passive resistance between the sides of the footing and the adjacent soil is only applicable where concrete is placed neatly against undisturbed soil. Voids created by concrete forms should be backfilled with compacted engineered fill or concrete.

50. The upper 1 foot of soil should be ignored when calculating passive soil resistance.

51. In computing the pressures transmitted to the soil by the footings, the embedded weight of the footing may be neglected.

52. Provided our recommendations are followed, total and differential settlement due to applied dead and live loads is expected to be within tolerable limits.

53. No footing should be placed closer than 10 feet to the top of a fill slope nor base of a cut slope.

54. No footing shall be placed on slopes steeper than 4:1 (H:V). If the intent is to place the foundation on sloping ground which exceeds 4:1 (H:V), Pacific Crest Engineering Inc. should be contacted for an alternative pier and grade beam foundation design.

55. All grade beams, thickened slab edges and other foundation elements which impart structure loads to the soil should be considered "footings" and constructed according to the recommendations of this section, including required depths below lowest adjacent grade.

56. The footing excavations must be free of loose material prior to placing concrete. The footing excavations should be thoroughly saturated prior to placing concrete.

57. Footing excavations must be observed by a representative of Pacific Crest Engineering Inc. before placement of formwork, steel and concrete to verify bedding into proper material.

58. The footings should contain steel reinforcement as determined by the project civil or structural engineer in accordance with applicable CBC or ACI Standards.

FOUNDATIONS – STRUCTURAL SLAB- WATER TANK

59. The following recommendations are based on the proposed tank location as shown on Figure 2 of this report. If the building site is changed, we request the opportunity to review proposed plans to confirm if these recommendations still apply.

60. To avoid consolidation of the underlying clays, the subgrade elevation underneath the mat slab foundation should be lowered such that when loaded with the water tank, the underlying clays will experience a net zero load increase. We anticipate that this will require burying the tank about 3 to 5 feet below existing grade.

61. The weight of tank, concrete slab and baserock sections should be considered when calculating the entire weight of the proposed structure.

62. For calculation purposes the weight of the soil to be removed should be assumed to be 110 pcf.

63. We understand that the tank will be founded on a structural concrete slab. Structural concrete slabs and all thickened edges should be underlain by a minimum of 24 inches of non-expansive compacted engineered fill that is placed and compacted as outlined in the earthwork section of this report. Additionally, the slab should be underlain by a minimum 12-inches of Class II baserock that is placed and compacted in accordance with the specifications in this report. This baserock may be counted as a portion of the required non-expansive subgrade section.

64. For structural mat foundations bearing on compacted engineered fill we recommend a unit modulus of subgrade reaction (K_1) of 125 pounds per cubic inch be used in the elastic analysis of the mat foundations. This value is a based on a 1-foot square bearing area; the subgrade modulus can be proportioned for the width of the relative footing reaction area by the expression:

$$K_o = K_1 \left[\frac{B+1}{2B}\right]^2$$

Where:

B = The effective width of the footing reaction area in feet.
K_1 = Unit modulus of subgrade reaction.
K_o = Reduced or actual modulus of subgrade reaction to use in elastic design.

65. Alternatively, the structural mat should be designed for an allowable bearing capacity of 600 psf, (dead plus live load). The allowable bearing capacity may be increased by one-third for wind or seismic loads.

66. The mat should be designed with thickened edges that extend at least 12 inches below lowest adjacent compacted pad grade and are a minimum of 8 inches wide.

67. The embedded portion of the mat may be assumed to have a lateral bearing pressure resistance value of 300 psf/ft for the section of mat embedded greater than 6 inches below the ground surface.

68. The mat may be assumed to have a resistance to lateral sliding of 0.35.

69. Provided our recommendations are followed, total and differential settlement due to applied dead and live loads is expected to be within tolerable limits.

70. No footing should be placed closer than 8 feet to the top of a fill slope nor closer than 5 feet from the base of a cut slope.

71. All foundation excavations must be free of loose material prior to placing concrete and should not be allowed to dry out prior to placing concrete.

72. Foundation excavations must be observed by a representative of Pacific Crest Engineering Inc. before placement of formwork, steel and concrete to verify bedding into proper material.

73. Mat foundations should contain steel reinforcement as determined by the project civil or structural engineer in accordance with applicable CBC or ACI Standards.

CONCRETE SLAB-ON-GRADE AND FLATWORK

74. Subgrade sections beneath all interior concrete slabs and exterior concrete flatwork should be comprised of non-expansive, engineered fill that has been prepared as recommended in the Earthwork section of this report.

75. All exterior slabs, sidewalks, curbs gutters, etc., should be a minimum of 4 inches thick, underlain by a minimum of 4 inches of Class 2 aggregate base and structurally independent of adjacent structural foundation systems.
76. All interior concrete slabs-on-grade should be underlain by a minimum 6-inch thick capillary break of ¾ inch clean crushed rock (no fines). It is recommended that neither Class II baserock nor sand be employed as the capillary break material.

77. The minimum aggregate base and/or capillary break sections should be considered as in addition to the recommended subgrade sections described in the Earthwork section of this report (i.e. sidewalks should be underlain by 4 inches of Class 2 aggregate base and 12 inches of non-expansive engineered fill).

78. Where floor coverings are anticipated or vapor transmission may be a problem, a vapor retarder/membrane should be placed between the capillary break layer and the floor slab in order to reduce the potential for moisture condensation under floor coverings. We recommend a high-quality vapor retarder at least 15 mil thick and puncture resistant (Stego Wrap or equivalent). The vapor retarder must meet the minimum specifications for ASTM E-1745, Standard Specification For Water Vapor Retarder. Please note that low density polyethylene film (such as Visqueen) may meet minimum current standards for permeability but not puncture resistance. Laps and seams should be overlapped at least six inches and properly sealed to provide a continuous layer beneath the entire slab that is free of holes, tears or gaps. Joints and penetrations should also be properly sealed.

79. Floor coverings should be installed on concrete slabs that have been constructed according to the guidelines outlined in ACI 302.2R and the recommendations of the flooring material manufacturer.

80. Currently, ACI 302-1R recommends that concrete slabs to receive moisture sensitive floor coverings be placed directly upon the vapor retarder, with no sand cushion. ACI states that vapor retarders are not effective in preventing residual moisture within the concrete slab from migrating to the surface. Including a low water-to-cement ratio (less than 0.50) and/or admixtures into the mix design are generally necessary to minimize water content, reduce soluble alkali content, and provide workability to the concrete. As noted in CIP 29 (Concrete in Practice by the National Ready Mixed

Concrete Association), placing concrete directly on the vapor retarder can also create potential problems. If environmental conditions do not permit rapid drying of bleed water from the slab surface then the excess bleeding can delay finishing operations (refer to CIP 13, 19 and 20). Most of these problems can be alleviated by using a concrete with a low water content, moderate cement factor, and well-graded aggregate with the largest possible size. With the increased occurrence of moisture related floor covering failures, minor cracking of floors placed on a vapor retarder and other problems discussed here are considered a more acceptable risk than failure of floor coverings, and these potential risks should be clearly understood by the Client and Project Owner.

81. If a sand layer is chosen as a cushion for slabs without floor coverings, it should consist of clean sand. Clean sand is defined as 100 percent passing the #4 sieve, and less than 5 percent passing the #200 sieve.

82. Requirements for pre-wetting of the subgrade soils prior to the pouring of the slabs will depend on the specific soils and seasonal moisture conditions and will be determined by a representative of Pacific Crest Engineering Inc. at the time of construction. It is important that the subgrade soils be properly moisture conditioned at the time the concrete is poured. Subgrade moisture contents should not be allowed to exceed our moisture recommendations for effective compaction and should be maintained until the slab is poured.

83. Final slab thickness, reinforcement, and doweling should be determined by the project civil or structural engineer. The use of welded wire mesh is not recommended for slab reinforcement.

PAVEMENT DESIGN

General

84. To have the selected pavement sections perform to their greatest efficiency, it is very important that the following items be considered:

a. Properly scarify and moisture condition the upper 8 inches of the subgrade soil and compact it to a minimum of 95% of its maximum dry density, at a moisture content of 1 to 3% over the optimum moisture content for the soil. Expansive subgrade soils should be moisture conditioned to between 3 to 5 percent above the laboratory optimum.

b. Provide sufficient gradient to prevent ponding of water.

c. Use only quality materials of the type and thickness (minimum) specified. All aggregate base must meet Caltrans Standard Specifications for Class 2 materials and be angular in shape. All Class 2 aggregate base should be ¾ inch maximum in aggregate size.

d. Compact the base uniformly to a minimum of 95% of its maximum dry density.

e. Maintenance should be performed on a routine basis.

85. Porous pavement systems which consist of porous paving blocks, asphaltic concrete or concrete are generally not recommended due to the potential for saturation of the subgrade soils and resulting

increased potential for a shorter pavement life. These pavement systems should only be used with the understanding by the Owner of the increased potential for pavement cracking, rutting, potholes, etc. At a minimum, porous pavement systems should include a layer of Mirafi HP370 geotextile fabric placed on the subgrade soil beneath the porous paving section.

86. All curbs and gutters constructed on slopes steeper that 3:1 (H:V) should be embedded a minimum of 12 inches and set back a minimum of 3 feet horizontally from the crown of the adjacent slope.

Asphalt Concrete Pavement Sections

87. The soils that will comprise the pavement subgrade range from fat clay to silty sand, with R-Values ranging from 5 to 26. We have conservatively assumed an "R" value of 5 for design of pavement sections provided below.

88. The following table provide flexible pavement design which is based on the 7th Edition of the Caltrans Highway Design Manual – Chapter 630 (last updated July 1, 2020). The design thickness layer was determined to the nearest 0.5 inch and includes a factor of 0.20 feet added to the asphalt concrete and aggregate base thicknesses, as outlined in the design procedure. Based on this procedure, the following minimum pavement sections are recommended:

TABLE No. 8 - Recommended Pavement Sections

Material	Traffic Index		
	4½	5	6
Asphalt Concrete	2.5 inches	3.0 inches	3.5 inches
Class 2 Aggregate Base, R=78 min.	12.0 inches	12.0 inches	14.0 inches
Total Section	*14.5 inches*	*15.0 inches*	*17.5 Inches*

89. Asphaltic concrete should only be placed during periods of fair weather when the free air temperature is within prescribed limits by Cal Trans Specifications.

SURFACE DRAINAGE

90. Surface drainage will be an important aspect of managing the effects of expansive soils upon planned and existing improvements. Drainage improvements around the existing buildings could help to alleviate building distress but will not eliminate it. Surface water drainage is the responsibility of the project civil engineer. The following should be considered by the civil engineer in design of the project.

91. The project should incorporate drainage improvements around planned and existing improvements in an effort to control soil moisture and minimize the shrink/swell effects of the underlying expansive soil. Landscaping plans should consider measures to maintain a consistent level of moderate soil moisture year-round. This typically includes semi-drought vegetation (as opposed to lawns or plants that need to be watered all summer).

92. Surface water must not be allowed to pond or be trapped adjacent to foundations, or on building pads and parking areas.

93. All roof eaves should be guttered, with the outlets from the downspouts provided with adequate capacity to carry the storm water away from structures to reduce the possibility of soil saturation and erosion. The connection should be in a closed conduit which discharges at an approved location away from structures and graded areas. Stormwater should not be conveyed onto permeable pavement surfaces.

94. Slope failures can occur where surface drainage is allowed to concentrate on unprotected slopes. Appropriate landscaping and surface drainage control around the project area is imperative in order to minimize the potential for shallow slope failures and erosion. Stormwater discharge locations should not be located at the top or on the face of any slope.

95. Final grades should be provided with positive gradient away from all foundation elements. Soil grades should slope away from foundations at least 5 percent for the first 10 feet. Impervious surfaces should slope away from foundations at least 2 percent for the first 10 feet. Concentrations of surface runoff should be handled by providing structures, such as paved or lined ditches, catch basins, etc.

96. Irrigation activities at the site should be done in a controlled and reasonable manner.

97. Following completion of the project we recommend that storm drainage provisions and performance of permanent erosion control measures be closely observed through the first season of significant rainfall, to determine if these systems are performing adequately and, if necessary, resolve any unforeseen issues.

98. The building and surface drainage facilities must not be altered, nor any filling or excavation work performed in the area without first consulting Pacific Crest Engineering Inc. Surface drainage improvements developed by the project civil engineer must be maintained by the property owner at all times, as improper drainage provisions can produce undesirable affects.

STORM WATER INFILTRATION

99. At the time we prepared this report, the project plans had not been completed and the infiltration locations and system details had not been finalized. We request an opportunity to review these plans during the design stages to determine if supplemental recommendations will be required.

100. Our infiltration test borings generally encountered sand with fat clay, clayey sand, clay with sand and sandy clay within the 2-foot test zone. The fines content (clay and silt fraction) within the infiltration zone ranged from 22.0% to 91.2%. These soil conditions facilitated Final Infiltration Rates (I_t) from 0.0 to 0.8 inches/hour, and Factored Infiltration Rates (k_f) from 0.0 to 0.40 inches/hour. Percolation test hole P-2 was an outlier, in which we encountered a layer of poorly graded sand. These soil conditions in P-2 facilitated Final Infiltration Rate (I_t) of 55.11 inches/hour, and a Factored Infiltration Rate (k_f) of

27.56 inches/hour. Refer to the Findings and Analysis section above and Appendix C of this report for a complete summary of all infiltration data.

101. Infiltration rates tend to decrease as the percentage of fine-grained soil increases. The Unified Soil Classification System defines fine grained soils as material with 50 percent or more passing the No. 200 sieve. Furthermore, fine grained soil can be divided into two sub-groups, silt and clay. The deviation between silt and clay is also dependent on the material's respective particle size, with silt being coarser grained than clay. Therefore, infiltration rates also tend to decrease as a soil transitions from silt to clay. A representative of Pacific Crest Engineering, Inc. should be present during the grading process to verify that the encountered soils are consistent with the conditions discussed in this report.

102. Infiltration of water adjacent to buildings may saturate surficial soils, resulting in a reduction of shear strength. This reduction in shear strength may trigger or exacerbate differential settlement of the structure. Therefore, we recommend that infiltration systems situated upslope of structures should be setback a minimum 15 feet horizontally from structural foundation elements, while infiltration systems situated downslope slope of structures should be setback a minimum of 10 feet horizontally from structural foundations. Infiltration areas should also be set back a minimum of 5 feet from all concrete slabs-on-grade and flatwork. Stormwater features within setback should be lined to prevent infiltration.

103. Maintenance of the storm water drainage facilities will be critical in order to maintain the design infiltration rates. The storm water drainage facilities must be inspected and maintained on a routine basis. Repairs and upgrades, whenever necessary, must be made in a timely manner. We recommended that the owner inspect the drainage systems prior to each rainy season, following the first significant rain, and throughout each rainy season. The Civil and Geotechnical Engineers should be consulted if significant drainage problems occur so that the conditions can be observed, and supplemental recommendations can be provided, as necessary.

EROSION CONTROL

104. The surface soils are classified as having a low to moderate potential for erosion. Therefore, the finished ground surface should be planted with ground cover and continually maintained to minimize surface erosion. For specific and detailed recommendations regarding erosion control on and surrounding the project site, the project civil engineer or an erosion control specialist should be consulted.

105. The surfaces of all cut and fill slopes should be prepared and maintained to reduce erosion. This work, at a minimum, should include track rolling of the slope and effective planting. The protection of the slopes should be installed as soon as practicable so that a sufficient growth will be established prior to inclement weather conditions. It is vital that no slope be left standing through a winter season without the erosion control measures having been provided.

PLAN REVIEW

106. We respectfully request an opportunity to review the project plans and specifications during preparation and before bidding to verify that the recommendations of this report have been included and to provide additional recommendations, if needed. These plan review services are also typically required by the reviewing agency. Misinterpretation of our recommendations or omission of our requirements from the project plans and specifications may result in changes to the project design during the construction phase, with the potential for additional costs and delays in order to bring the project into conformance with the requirements outlined within this report. Services performed for review of the project plans and specifications are considered "post-report" services and billed on a "time and materials" fee basis in accordance with our latest Standard Fee Schedule.

VI. LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. This Geotechnical Investigation was prepared specifically for SSA Landscape Architects and for the specific project and location described in the body of this report. This report and the recommendations included herein should be utilized for this specific project and location exclusively. This Geotechnical Investigation should not be applied to nor utilized on any other project or project site.

2. The recommendations of this report are based upon the assumption that the soil conditions do not deviate from those disclosed in the borings. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that planned at the time, our firm should be notified so that supplemental recommendations can be provided.

3. This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are called to the attention of the Architects and Engineers for the project and incorporated into the plans, and that the necessary steps are taken to ensure that the Contractors and Subcontractors carry out such recommendations in the field.

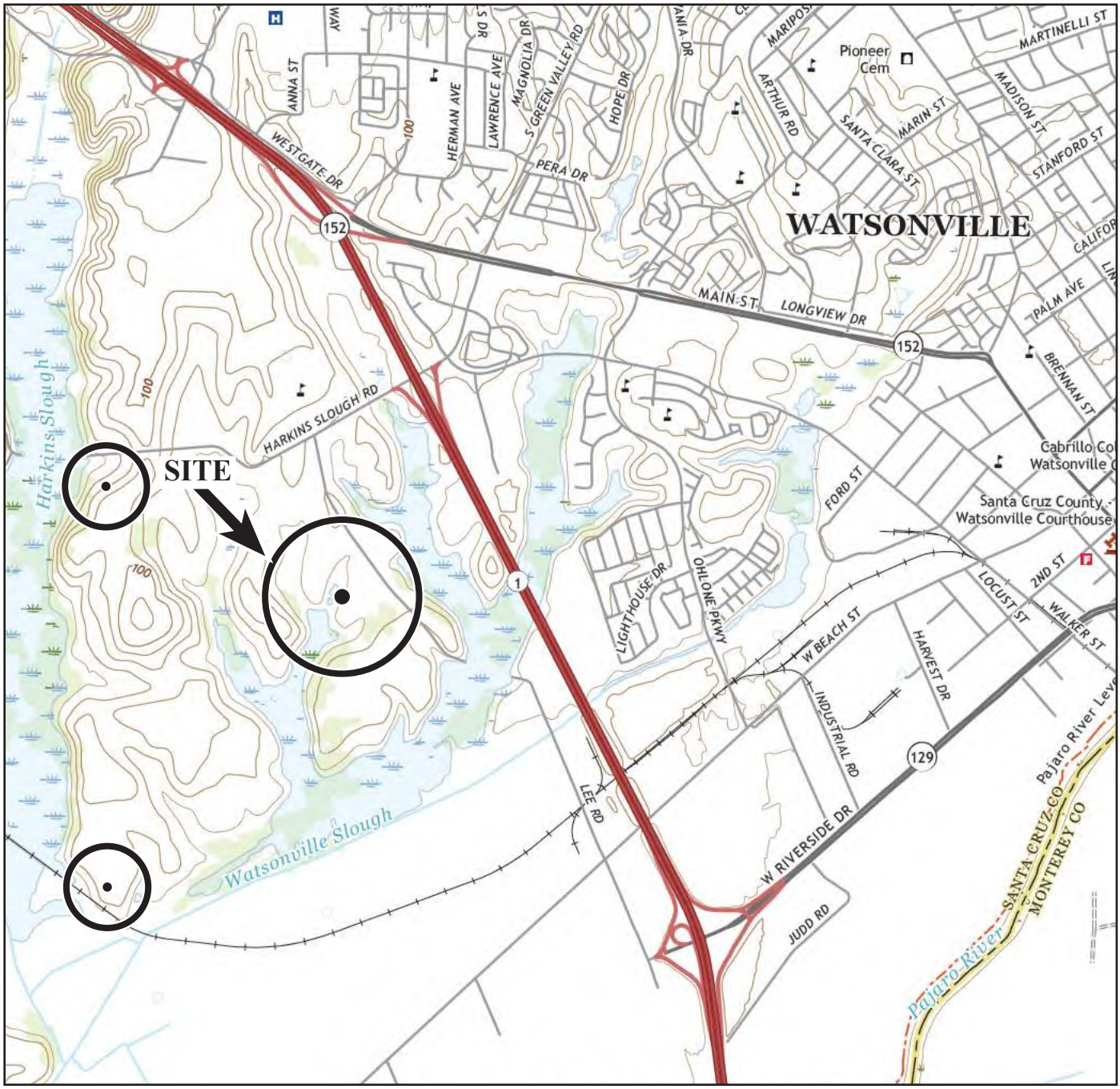
4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural process or the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or partially, by changes outside of our control. This report should therefore be reviewed in light of future planned construction and then current applicable codes. This report should not be considered valid after a period of two (2) years without our review.

5. This report was prepared upon your request for our services in accordance with currently accepted standards of professional geotechnical engineering practice. No warranty as to the contents of this report is intended, and none shall be inferred from the statements or opinions expressed.

6. The scope of our services mutually agreed upon for this project did not include any environmental assessment or study for the presence of hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site.

APPENDIX A

Regional Site Map
Site Map Showing Test Borings
Key to Soil Classification
Log of Test Borings
Atterberg Limits
Corrosivity Test Summary
Keyway & Bench Detail

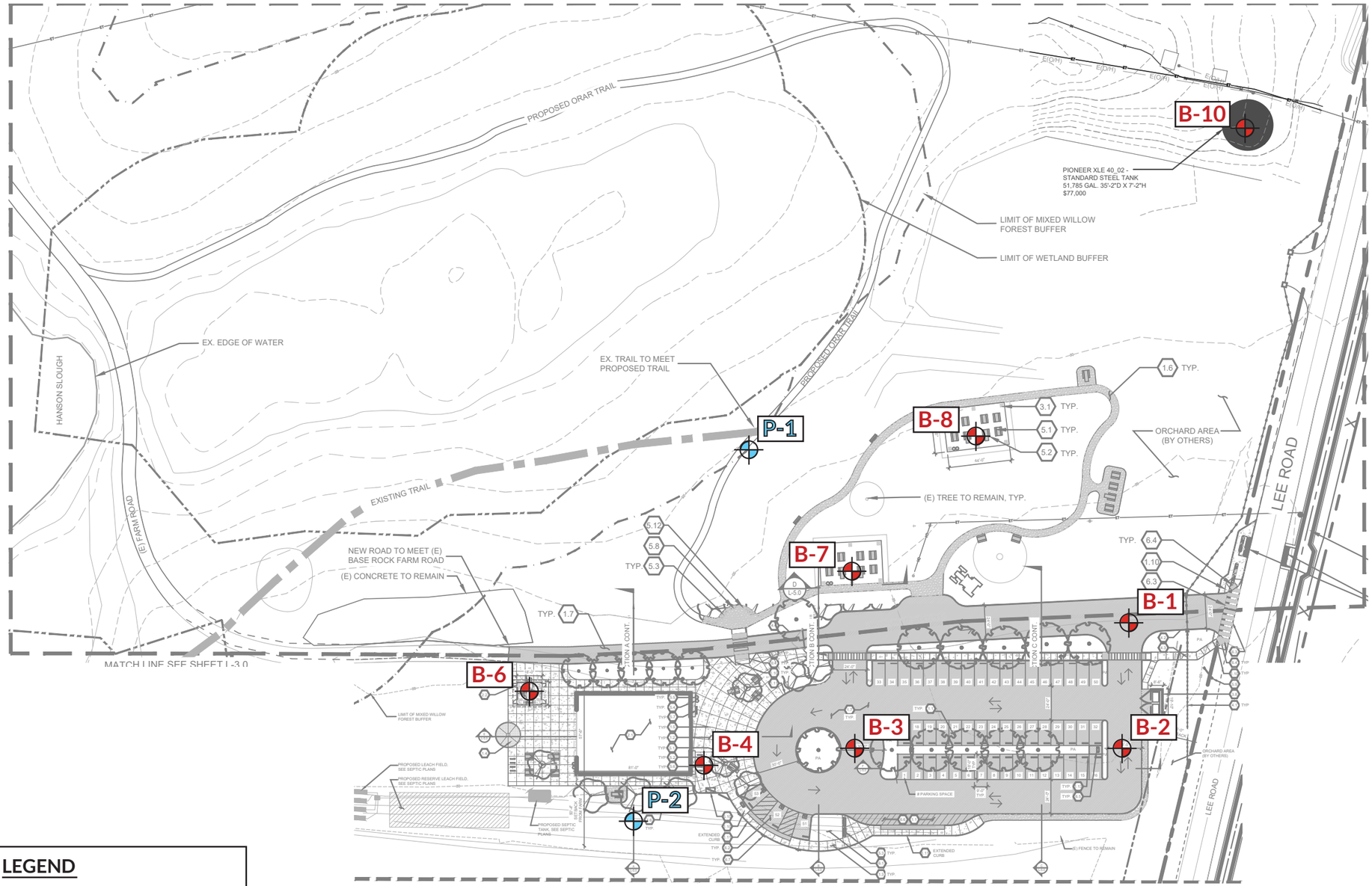


0 2000 ft.

N

Base Map: Watsonville West Quadrangle, California U.S Geological Survey 7.5 Quadrangle, 2021, scale 1:24,000

Pacific Crest ENGINEERING INC	**Regional Site Map** Community Harvest Project Watsonville, California	Figure No. 1 Project No. 2219 Date: 6/13/24



LEGEND

B-10 — Approximate location of test boring

P-2 — Approximate location of infiltration boring

Base Map: Site Plan - Watsonville Slough Farm Community Harvest Project, Sheet L-3.0 and L-3.1, dated 10-10-2023 and Site Plan - Tank Schematic, dated 2-01-2024

N

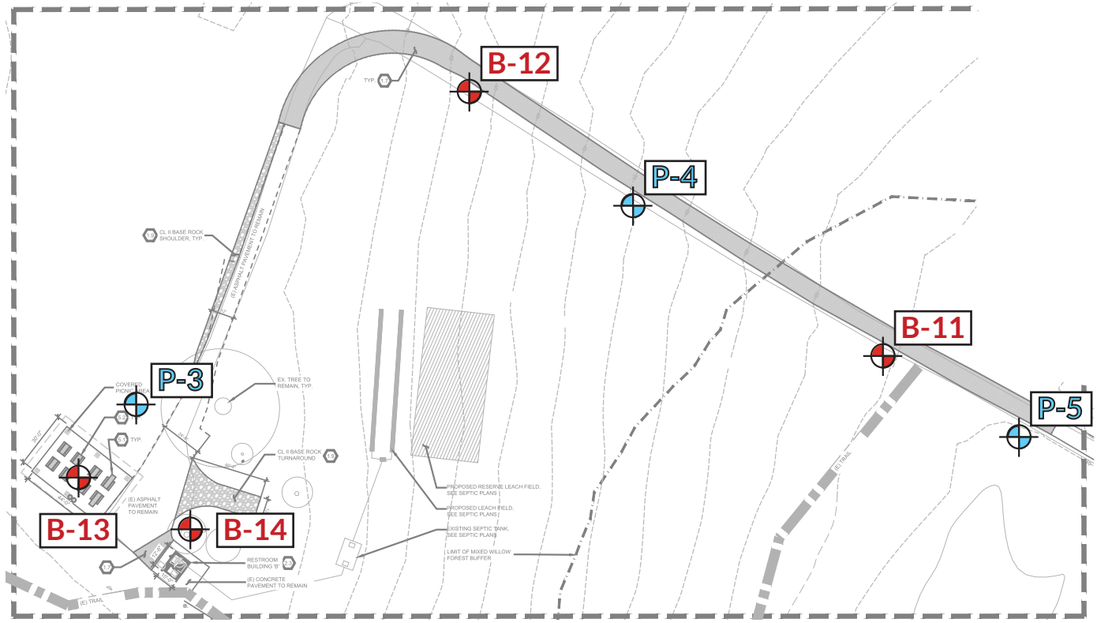
0 80 160

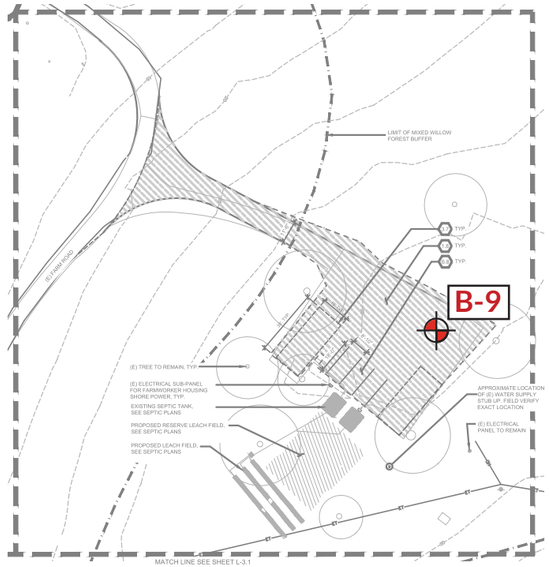
Scale: 1 inch = 80 feet

Pacific Crest ENGINEERING INC

Site Map Showing Test Borings
Community Harvest Project
Watsonville, California

Figure No. 2
Project No. 2219
Date: 6/13/24





LEGEND

B-14 — Approximate location of test boring

P-5 — Approximate location of infiltration boring

Base Map: Site Plan - Watsonville Slough Farm Community Harvest Project, Sheet L-3.3 and L-3.4, dated 10-10-2023

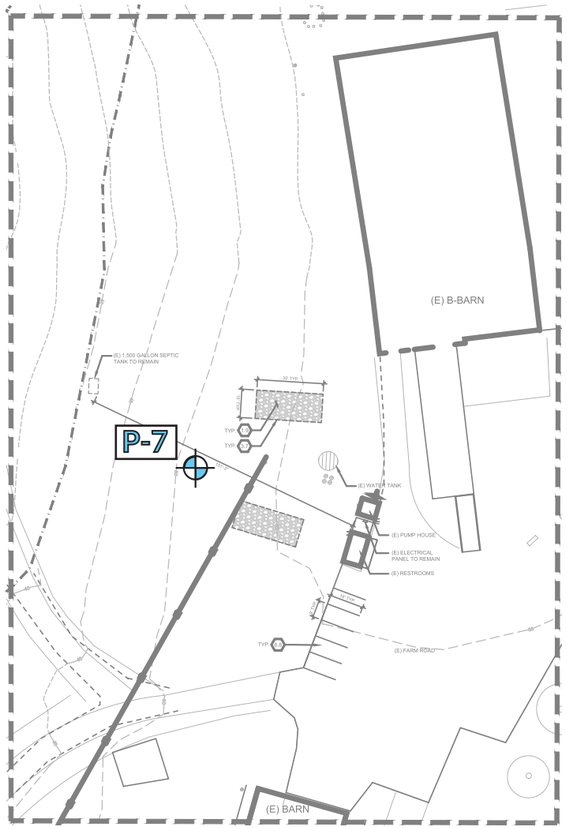
0 80 160

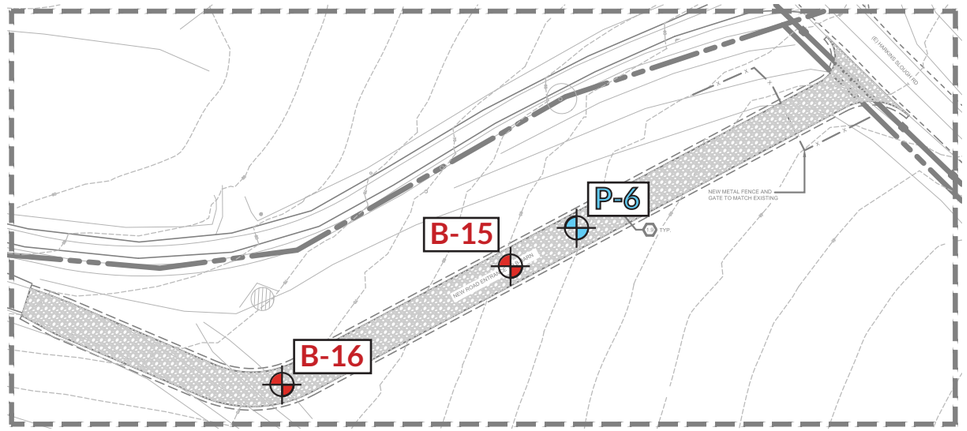
Scale: 1 inch = 80 feet

Pacific Crest ENGINEERING INC

Site Map Showing Test Borings
Community Harvest Project
Watsonville, California

Figure No. 3
Project No. 2219
Date: 6/13/24





LEGEND

B-16 — Approximate location of test boring

P-7 — Approximate location of infiltration boring

Base Map: Site Plan - Watsonville Slough Farm Community Harvest Project, Sheet L-3.6 and L-3.7, dated 10-10-2023

N

0 80 160

Scale: 1 inch = 80 feet

Pacific Crest ENGINEERING INC

Site Map Showing Test Borings
Community Harvest Project
Watsonville, California

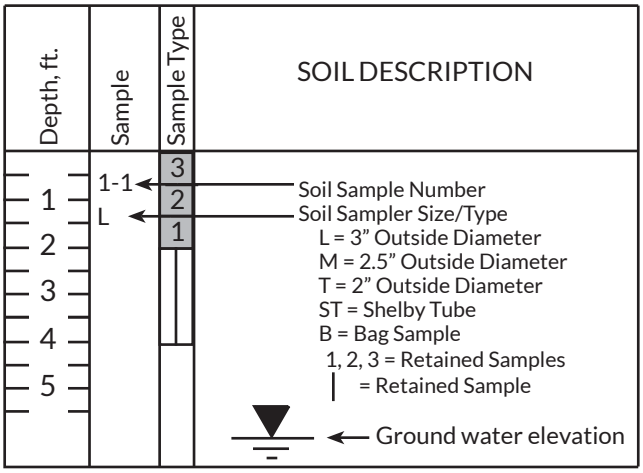
Figure No. 4
Project No. 2219
Date: 6/13/24

KEY TO SOIL CLASSIFICATION - FINE GRAINED SOILS (FGS)
UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2487 (Modified)

MAJOR DIVISIONS		SYMBOL	FINES	COARSENESS	SAND/GRAVEL	GROUP NAME
SILT AND CLAY	*LL < 35% Low Plasticity	**CL** Lean Clay PI > 7 Plots Above A Line -OR- **ML** Silt PI > 4 Plots Below A Line	<30% plus No. 200	<15% plus No. 200		Lean Clay / Silt
				15-30% plus No. 200	% sand ≥ % gravel	Lean Clay with Sand / Silt with Sand
					% sand < % gravel	Lean Clay with Gravel / Silt with Gravel
			≥30% plus No. 200	% sand ≥ % gravel	< 15% gravel	Sandy Lean Clay / Sandy Silt
					≥ 15% gravel	Sandy Lean Clay with Gravel / Sandy Silt with Gravel
				% sand < % gravel	< 15% sand	Gravelly Lean Clay / Gravelly Silt
					≥ 15% sand	Gravelly Lean Clay with Sand / Gravelly Silt with Sand
		CL - ML 4 < PI < 7	<30% plus No. 200	<15% plus No. 200		Silty Clay
				15-30% plus No. 200	% sand ≥ % gravel	Silty Clay with Sand
					% sand < % gravel	Silty Clay with Gravel
			≥30% plus No. 200	% sand ≥ % gravel	< 15% gravel	Sandy Silty Clay
					≥15% gravel	Sandy Silty Clay with Gravel
				% sand < % gravel	< 15% sand	Gravelly Silty Clay
					≥15% sand	Gravelly Silty Clay with Sand
	35% ≤ *LL < 50% Intermediate Plasticity	**CI**	<30% plus No. 200	<15% plus No. 200		Clay
				15-30% plus No. 200	% sand ≥ % gravel	Clay with Sand
					% sand < % gravel	Clay with Gravel
			≥30% plus No. 200	% sand ≥ % gravel	< 15% gravel	Sandy Clay
					≥ 15% gravel	Sandy Clay with Gravel
				% sand < % gravel	< 15% sand	Gravelly Clay
					≥ 15% sand	Gravelly Clay with Sand
	*LL > 50% High Plasticity	**CH** Fat Clay Plots Above A Line -OR- **MH** Elastic Silt Plots Below A Line	<30% plus No. 200	<15% plus No. 200		Fat Clay or Elastic Silt
				15-30% plus No. 200	% sand ≥ % gravel	Fat Clay with Sand Elastic Silt with Sand
					% sand < % gravel	Fat Clay with Gravel / Elastic Silt with Gravel
			≥30% plus No. 200	% sand ≥ % gravel	< 15% gravel	Sandy Fat Clay / Sandy Elastic Silt
					≥ 15% gravel	Sandy Fat Clay with Gravel / Sandy Elastic Silt with Gravel
				% sand < % gravel	< 15% sand	Gravelly Fat Clay / Gravelly Elastic Silt
					≥ 15% sand	Gravelly Fat Clay with Sand / Gravelly Elastic Silt with Sand

* LL = Liquid Limit
* PI = Plasticity Index

BORING LOG EXPLANATION



MOISTURE

DESCRIPTION	CRITERIA
DRY	Absence of moisture, dusty, dry to the touch
MOIST	Damp, but no visible water
WET	Visible free water, usually soil is below the water table

CONSISTENCY

DESCRIPTION	UNCONFINED SHEAR STRENGTH (KSF)	STANDARD PENETRATION (BLOWS/FOOT)
VERY SOFT	< 0.25	< 2
SOFT	0.25 - 0.5	2 - 4
FIRM	0.5 - 1.0	5 - 8
STIFF	1.0 - 2.0	9 - 15
VERY STIFF	2.0 - 4.0	16 - 30
HARD	> 4.0	> 30

Pacific Crest ENGINEERING INC

Boring Log Explanation - FGS
Community Harvest Project
Watsonville, California

Figure No. 5
Project No. 2219
Date: 6/13/24

KEY TO SOIL CLASSIFICATION - COARSE GRAINED SOILS
UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2487 (Modified)

MAJOR DIVISIONS		FINES	GRADE/TYPE OF FINES	SYMBOL	GROUP NAME *
GRAVEL	More than 50% of coarse fraction is larger than No. 4 sieve size	<5%	Cu ≥ 4 and 1 ≤ Cc ≤ 3	GW	Well-Graded Gravel/ Well-Graded Gravel with Sand
			Cu < 4 and/or 1 > Cc > 3	GP	Poorly Graded Gravel/Poorly Graded Gravel with Sand
		5-12%	ML or MH	GW - GM	Well-Graded Gravel with Silt / Well- Graded Gravel with Silt and Sand
				GP - GM	Poorly Graded Gravel with Silt / Poorly Graded Gravel with Silt and Sand
			CL, CI or CH	GW - GC	Well-Graded Gravel with Clay / Well-Graded Gravel with Clay and Sand
				GP - GC	Poorly Graded Gravel with Clay / Poorly Graded Gravel with Clay and Sand
		>12%	ML or MH	GM	Silty Gravel / Silty Gravel with Sand
			CL, CI or CH	GC	Clayey Gravel/ Clayey Gravel with Sand
			CL - ML	GC - GM	Silty, Clayey Gravel/Silty, Clayey Gravel with Sand
SAND	50% or more of coarse fraction is smaller than No. 4 sieve size	<5%	Cu ≥ 6 and 1 ≤ Cc ≤ 3	SW	Well-Graded Sand / Well-Graded Sand with Gravel
			Cu < 6 and/or 1 > Cc > 3	SP	Poorly Graded Sand / Poorly Graded Sand with Gravel
		5-12%	ML or MH	SW - SM	Well-Graded Sand with Silt / Well- Graded Sand with Silt and Gravel
				SP - SM	Poorly Graded Sand with Silt / Poorly Graded Sand with Silt and Gravel
			CL, CI or CH	SW - SC	Well-Graded Sand with Clay / Well-Graded Sand with Clay and Gravel
				SP - SC	Poorly Graded Sand with Clay / **Poorly Graded Sand** with Clay and Gravel
		>12%	ML or MH	SM	Silty Sand / Silty Sand with Gravel
			CL, CI or CH	SC	Clayey Sand / Clayey Sand with Gravel
			CL - ML	SC - SM	Silty, Clayey Sand / Silty, Clayey Sand with Gravel

* The term "with sand" refers to materials containing 15% or greater sand particles within a gravel soil, while the term "with gravel" refers to materials containing 15% or greater gravel particles within a sand soil.

US STANDARD SIEVE SIZE:	3 inch	¾ inch	No. 4	No. 10	No. 40	No. 200	0.002 μm
	COARSE	FINE	COARSE	MEDIUM	FINE		
COBBLES AND BOULDERS	GRAVEL		SAND			SILT	CLAY

RELATIVE DENSITY

DESCRIPTION	STANDARD PENETRATION (BLOWS/FOOT)
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	> 50

MOISTURE

DESCRIPTION	CRITERIA
DRY	Absence of moisture, dusty, dry to the touch
MOIST	Damp, but no visible water
WET	Visible free water, usually soil is below the water table

Pacific Crest ENGINEERING INC

Boring Log Explanation - CGS
Community Harvest Project
Watsonville, California

Figure No. 6
Project No. 2219
Date: 6/13/24

LOGGED BY MP DATE DRILLED 4-1-24 BORING DIAMETER 6" SS BORING NO. 1

DRILL RIG CCD - Mobile Drill HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1			**SANDY CLAY:** dark brown (10YR 3/3), moderate plasticity, fine grained sand, scattered rootlets, moist, stiff	CL								
	1-1 L				3							
2		2			8							
		1			8	10		24.1	94.4			EI = 78
3	1-2 T		brown (10YR 5/3), very fine grained sand, micaceous, moist, stiff		3							
					4							
4					8	12		20.0		58.1	23	Atterberg Limits LL = 37% PL = 14% PI = 23
5												
	1-3 L				12							
6		2			17							
		1	Iron-oxide staining, moist, very stiff		27	29						
7			Boring terminated at 6½ feet. No groundwater encountered.									
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 7
Project No. 2219
Date: 6/13/24

LOGGED BY MP DATE DRILLED 4/1/24 BORING DIAMETER 6" SS BORING NO. 2

DRILL RIG CCD - Mobile Drill HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1	2-1 L		**CLAY:** brown (10YR 4/3) with black (10YR 2/1), exhibits low to moderate plasticity, few mica flakes, trace rootlets, moist, stiff	CL	2							
2					7							
		1			8	10	2.5					
3	▽		**CLAYEY SAND:** brown (10YR 5/3), very fine grained sand, subangular to subrounded, composed of quartz and feldspar, exhibits low plasticity, wet, medium dense	SC	6							
	2-2 T				7							
4			**SANDY CLAY:** grayish brown (10YR 5/2), exhibits low plasticity, very fine grained, micaceous, subhorizontal iron-oxide staining, moist, very stiff	CL	11	18						
5	2-3 T		**FAT CLAY:** gray (10YR 6/1) with mottled reddish brown (5YR 4/3), high plasticity, iron-oxide banding, moist, stiff	CH	2							Atterberg Limits
					3							LL = 65%
6					6	9		33.6			46	PL = 18% PI = 46
7			Boring terminated at 6½ feet. Perched groundwater encountered at 3 feet.									
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 8
Project No. 2219
Date: 6/13/24

LOGGED BY MP DATE DRILLED 4/1/24 BORING DIAMETER 6" SS BORING NO. 3

DRILL RIG CCD - Mobile Drill HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1			**CLAY:** black (10YR 2/1), low plasticity, massive, scattered rootlets, moist, stiff	**CL**								
1	3-1 L	2			3							
2		1			6							
2					10	10		24.4	97.4			EI = 50
3	3-2 T		**FAT CLAY:** gray (10YR 4/1) with mottled reddish brown (5YR 5/3), exhibits high plasticity, trace subrounded pebbles, abundant iron-oxide staining, moist, stiff	**CH**	4							
3					5							
4					8	13						
5												
5	3-3 T		moist, stiff		7							
6			**SANDY CLAY:** brown (10YR 4/3), exhibits low plasticity, very fine grained, sand is well sorted, subangular to subrounded, composed of quartz, feldspar, and mafics, moist, hard	**CL**	17							
6					17	34		14.4		56.2		
7			Boring terminated at 6½ feet. No groundwater encountered.									
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 9
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/1/24 | BORING DIAMETER 6" SS | BORING NO. 4

DRILL RIG CCD - Mobile Drill | HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1	4-1 L	2 1	**FAT CLAY:** black (10YR 2/1), high plasticity, trace fine grained sand, subangular, quartz-rich, scattered rootlets, moist, very stiff	CH	3 6					82.0	35	
3	4-2 T		Color change to light yellowish brown (10YR 6/4), high plasticity, massive, iron-oxide nodules, moist, stiff		10 3 6 9	10 15	2.25	29.5	85.7			Qu = 2.699 ksf
5	4-3 L	2 1	**CLAYEY SAND:** light yellowish brown (10YR 6/4), very fine grained, well sorted, subangular to subrounded, composed of quartz, feldspar, and mafics, massive, scattered iron-oxide staining, moist, dense	SC	14 26 32	38		16.4	103.1	39.6		
9	4-4 T		**INTERBEDDED CLAY AND SAND:** pale brown (10YR 6/3), beds of approximately 2-4 inches, clay exhibits moderate plasticity, subhorizontal iron-oxide staining, sand is very fine grained, subangular to subrounded, composed of quartz, feldspar, mafics, moist, very stiff/medium dense	CL/ SP	3 6 6 12 17 20	12 24						
15	4-5 L	2 1	**CLAY:** brownish yellow (10YR 6/6), exhibits low plasticity, trace fine to coarse grained sand, subangular to subrounded, composed of quartz, feldspar, and mafics, exhibits moderate plasticity, massive, scattered iron-oxide staining, moist, hard	CL	11 50/6"	65		73.5	69.9	85.6		
20	4-6 T		**POORLY GRADED SAND WITH CLAY:** brown (10YR 4/3), very fine grained, well sorted, subangular to subrounded, composed of quartz, feldspar, mafics, mica flakes, massive, moist, dense	SP -SC	10 21 25	46		19.6		8.6		
22			Boring terminated at 21½ feet. No groundwater encountered.									

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Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 10
Project No. 2219
Date: 6/13/24

LOGGED BY MP DATE DRILLED 4/1/24 BORING DIAMETER 6" SS BORING NO. 5

DRILL RIG CCD - Mobile Drill HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1	5-1 L	2	**FAT CLAY:** black (10YR 2/1), exhibits high plasticity, massive, iron-oxide nodules, scattered rootlets, moist, stiff	CH	3							
2		1			7							
					7	9						EI = 98
3	5-2 T		**SANDY CLAY:** brown (10YR 4/3), exhibits moderate plasticity, very fine grained, quartz-rich, trace iron-oxide nodules, moist, stiff	CL	3							
4					4							
					10	14						
5	5-3 L	2			12							
6		1			18							
			CLAYEY SAND: light yellowish brown (10YR 6/4), very fine grained, well sorted, subangular to subrounded, composed of quartz, feldspar, and mafics, exhibits low plasticity, massive, scattered iron-oxide staining, moist, dense	SC	32	33	2.0	15.7	94.0	37.3		
7												
8												
9												
10	5-4 T		**SANDY CLAY:** light yellowish brown (10YR 6/4), exhibits low plasticity, sand is very fine grained, well sorted, subangular to subrounded, composed of quartz, feldspar, and mafics, massive, scattered iron-oxide staining, moist, hard	CL	20							
11					24							
					27	51		22.1		67.4		
12												
13												
14												
15	5-5 L	2	grayish brown (10YR 5/2), increase in iron-oxide nodules, moist, hard		19							
16		1			20							
					32	52						
17												
18												
19												
20	5-6 T				14							
21			moist, hard		21							
					29	50						
22			Boring terminated at 21½ feet. No groundwater encountered.									
23												

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Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 11
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/1/24 | BORING DIAMETER 6" SS | BORING NO. 6

DRILL RIG CCD - Mobile Drill | HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1	6-1 L	2	**SANDY CLAY:** dark grayish brown (10YR 4/2), exhibits moderate plasticity, medium grained, quartz-rich, subrounded, trace subangular to subrounded gravel, scattered rootlets, mixed appearance, moist, stiff	CL	3							
2		1			5							
					9	9		19.7	97.8	58.4		
3	6-2 T		**FAT CLAY:** gray (10YR 5/1), high plasticity, abundant iron-oxide nodules, moist, stiff	CH	3							
4					4							
					5	9		29.9			56	
5	6-3 L	2	**CLAYEY SAND:** dark gray (10YR 4/1), very fine grained, well sorted, subrounded, composed of quartz and feldspar, exhibits low plasticity, massive, moist, very dense	SC	12							
6		1			50/6"	65		15.8	94.4			Qu = 0.567 ksf
7												
8												
9												
10	6-4 T		**CLAY WITH SAND:** dark gray (10YR 4/1) moderate plasticity, sand is very fine grained, well sorted, subrounded, composed of quartz and feldspar, moist, stiff	CL	7							
11					8							
					10	18		22.9		75.9		
12												
13												
14												
15	6-5 T		faint horizontal laminations visible, increase in fines, moist, medium dense		13							
16					14							
					15	29		17.5		68.1	21	
17			Boring terminated at 16½ feet. No groundwater encountered.									
18												
19												
20												
21												
22												
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 12
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/1/24 | BORING DIAMETER 6" SS | BORING NO. 7

DRILL RIG CCD - Tractor Rig | HAMMER TYPE 140-lb Hammer with Pulley

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1	7-1 L	2	**CLAY:** black (10YR 2/1) with brown (10YR 4/3), exhibits moderate plasticity, massive, scattered rootlets, moist, firm	CL	2							
2		1			3							EI = 59
3	▽		trace fine-grained quartz sand, moist, firm		5 2	5	2.5	21.8	94.6			Qu = 1.452 ksf
4	7-2 T		**SANDY CLAY:** grayish brown (10YR 5/2), low plasticity, sand is very fine grained, composed of quartz and feldspar, subangular to subrounded, wet, stiff	CL	5 5	10		22.8		68.4		
5	7-3 L	2	mottled black (10YR 2/1), subvertical iron-oxide staining, micaceous, very stiff, wet		8 16			25.9	74.3	55.8		
6		1			17	21						
10	7-4 T		**FAT CLAY:** yellowish brown (10YR 5/6), exhibits high plasticity, trace iron-oxide staining, moist, very stiff	CH	5 5							
11					11	16		39.9			45	
15	7-5 T		**INTERBEDDED CLAY AND SAND:** gray (10YR 5/1) with reddish brown (5YR 5/4), 2-4 inch beds, clay exhibits low plasticity, sand is fine grained, well sorted, subangular to subrounded, composed of quartz, feldspar, mafics, moist, stiff/medium dense	CL/SP	6 10							
16					13	23						
17			Boring terminated at 16½ feet. Perched groundwater encountered.									

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Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 13
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/3/24 | BORING DIAMETER 6" SS | BORING NO. 8

DRILL RIG CCD - Tractor Rig | HAMMER TYPE 140-lb Hammer with Pulley

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
0			**FAT CLAY:** black (10YR 2/1), high plasticity, moist, stiff	CH								
1	8-1 L				3							
2		2			8			22.2	82.7		31	
2		1	**FAT CLAY:** brown (10YR 5/3) with mottled reddish brown (5YR 5/4), high plasticity, very fine grained sand, subangular to subrounded, composed of quartz, feldspar, mafics, exhibits low plasticity, iron-oxide staining, moist, stiff	CH	12	13		23.8	97.3			Qu = 1.854 ksf
3					3							
3	8-2 T				6							
4					7	13		29.7		93.6	30	
4			**CLAY:** brown (10YR 5/3), exhibits moderate plasticity, moist, very stiff	CL	12							
5	▽	2			13							
5	8-3-L	1	**SANDY CLAY:** grayish brown (10YR 5/2), exhibits low plasticity, very fine grained, micaceous, massive, iron-oxide banding, wet, very stiff	CL	15	18						
7			**FAT CLAY:** gray (10YR 5/1), exhibits high plasticity, massive, trace iron-oxide nodules, moist, very stiff	CH								
8					6							
9	8-4 T				13							
9					13	26		29.7		96.2		
10			**SANDY LEAN CLAY:** brown (10YR 5/3) with mottled reddish brown (5YR 5/4), exhibits low plasticity, fine grained, quartz-rich, micaceous, massive, scattered iron-oxide staining, moist, very stiff	CL								
13			**FAT CLAY:** gray (10YR 5/1), high plasticity, massive, trace iron-oxide nodules, moist, very stiff	CH	8							
14	8-5 T				10							
15					14	24		29.6			32	
15			Boring terminated at 15 feet. Perched groundwater encountered at 5 feet.									

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Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 14
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/1/24 | BORING DIAMETER 6" SS | BORING NO. 9

DRILL RIG CCD - Mobile Drill | HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1			**FAT CLAY:** brown (10YR 5/3), high plasticity, scattered rootlets, moist, stiff	**CH**								
1	9-1 L				5							
2		2			10							
2		1			10	13		19.1	97.2		29	Qu = 4.729 ksf
3	9-2 T		**SANDY CLAY:** gray (10YR 4/1) with mottled yellowish red (5YR 4/6), exhibits low plasticity, very fine grained, micaceous, massive, scattered iron-oxide staining, moist, stiff	**CI**	3							
4					4							
4					7	11						
5												
5	9-3 L				7							
6		2			6							
6		1	increase in iron-oxide staining, moist, firm		4	7						
7			Boring terminated at 6½ feet. No groundwater encountered.									
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

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Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 15
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/3/24 | BORING DIAMETER 6" SS | BORING NO. 10

DRILL RIG CCD - Tractor Rig | HAMMER TYPE 140-lb Hammer with Pulley

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1			**FAT CLAY:** black (10YR 2/1), exhibits high plasticity, trace rootlets, moist, firm	**CH**								
1	10-1 L				2							
2		2			3			29.4	73.9			
2		1			7	7						
3					2							
3			trace subangular claystone gravel, trace iron-oxide staining, moist, stiff		3							
4	10-2 T				6	9						
4			**CLAYEY SAND:** very dark grayish brown (10YR 3/2), fine grained, subangular, composed of quartz and feldspar, micaceous, massive, scattered iron-oxide nodules, exhibits high plasticity, moist, loose	**SC**	4							
5	10- 3 T				4							
5					6	10		22.3		29.6		
6												
7												
8												
8					8							
9	10-4 L	2	moist, medium dense		17							
9		1	**FAT CLAY:** pale brown (10YR 6/3), exhibits high plasticity, massive, trace iron-oxide staining, moist, very stiff	**CH**	18	23						
10												
11												
12												
13												
14					9							
14	8-5 T		gray (10YR 6/1), subvertical iron-oxide staining, moist, very stiff		11							
15					15	26						
15			Boring terminated at 15 feet. No groundwater encountered.									
16												
17												
18												
19												
20												
21												
22												
23												

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Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 16
Project No. 2219
Date: 6/13/24

LOGGED BY MP DATE DRILLED 4/3/24 BORING DIAMETER 6" SS BORING NO. 11

DRILL RIG CCD - Tractor Rig HAMMER TYPE 140-lb Hammer with Pulley

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
0			**FAT CLAY:** dark grayish brown (10YR 4/2), exhibits high plasticity, moist, firm	**CH**								
1	11-1 L				3							
2		2			4							
		1			6	7	1.5					
3	11-2 T				2							
			SANDY FAT CLAY: light grayish brown (10YR 6/2), high plasticity, fine grained, subangular to subrounded, composed of quartz, feldspar, and mafics, micaceous, scattered iron-oxide nodules, moist, stiff	**CH**	3							
4					6	9		17.7			28	
5	11-3 L				5							
6		2			8			19.2	99.9	68.8		
		1	increase in iron-oxide staining, moist, stiff		10	12	3.0					
7			Boring terminated at 6½ feet. No groundwater encountered.									
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

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Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 17
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/3/24 | BORING DIAMETER 6" SS | BORING NO. 12

DRILL RIG CCD - Tractor Rig | HAMMER TYPE 140-lb Hammer with Pulley

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1	12-1 L	2	**SANDY CLAY:** light yellowish brown (10YR 6/4), exhibits low plasticity, very fine grained, subangular to subrounded, composed of quartz and feldspar, micaceous, massive, moist, stiff	CL	5							
2		1			9							
					9	12	2.5					
3	12-2 T		**CLAYEY SAND:** yellowish brown (10YR 5/6), very fine grained, well sorted, subangular to subrounded, composed of quartz, feldspar, and mafics, very low plasticity, massive, moist, loose	SC	3							
					4							
4					6	10		13.6			6	
5	12-3 T				4							
					4							
6			moist, loose		6	10		15.4		15.8		
7			Boring terminated at 6½ feet. No groundwater encountered.									
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 18
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/3/24 | BORING DIAMETER 6" SS | BORING NO. 13

DRILL RIG CCD - Tractor Rig | HAMMER TYPE 140-lb Hammer with Pulley

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1	13-1 L	2	**CLAY WITH SAND:** yellowish brown (10YR 5/4), moderate plasticity, fine grained, subangular to subrounded, composed of quartz, feldspar, and mafics, scattered iron-oxide staining, moist, stiff	CI	3							
2		1			7		1.5					
3	13-2 T		gray (10YR 6/1) with mottled reddish brown (5YR 5/4), increase in sand content and iron-oxide staining, moist, stiff		11 4 5	12		19.2	103.5		22	
4					5	10		26.9		72.1		
5	13- 3 L	2			7 7							
6		1	**POORLY GRADED SAND WITH CLAY:** light yellowish brown (10YR 6/4), fine grained, well sorted, subangular to subrounded, composed of quartz, feldspar, and mafics, moist, medium dense	SP-SC	10	11						
7												
8												
9	13-4 T		moist, medium dense		6 9 8	17		7.8		6.3		
10												
11												
12												
13												
14	13-5 T		brownish yellow (10YR 6/6), some angular quartz gravel and subangular claystone pebbles, moist, medium dense		7 11 13	24						
15			Boring terminated at 15 feet. No groundwater encountered.									
16												
17												
18												
19												
20												
21												
22												
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 19
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/1/24 | BORING DIAMETER 6" SS | BORING NO. 14

DRILL RIG CCD - Mobile Drill | HAMMER TYPE Wireline - Downhole Hammer

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1	14-1 L	2	**CLAYEY SAND:** yellowish brown (10YR 5/6), very fine grained, subangular to subrounded, composed of quartz, feldspar, and mafics, micaceous, exhibits low plasticity, moist, loose	SC	3							
2		1			4			18.7	105.5	39.6	12	
3	14-2 T		**CLAY:** gray (10YR 5/1) with mottled reddish brown (5YR 4/3), exhibits low to moderate plasticity, scattered iron-oxide staining, very stiff, moist	CI	10	9						
4					3							
5	14-3 L	2	**POORLY GRADED SAND:** light yellowish brown (10YR 6/4), very fine grained, well sorted, subangular to subrounded, composed of quartz, feldspar, mafics, trace iron-oxide staining, moist, medium dense	SP	6							
6		1			13	19						
7					9							
8					12							
9					13	16						
10	14-4 T		**CLAYEY SAND:** gray (10YR 5/1), very fine grained, well sorted, subangular to subrounded, composed of quartz, feldspar, mafics, trace iron-oxide staining, low plasticity, moist, medium dense	SC	8							
11					10							
12					12	22		10.0		18.1		
13												
14												
15	14-5 T		gray with white (10YR 8/1), less iron-oxide staining, sand coarsens to fine grained, moist, medium dense		4							
16					7							
17			Boring terminated at 16½ feet. No groundwater encountered.		15	22						
18												
19												
20												
21												
22												
23												

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Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 20
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/3/24 | BORING DIAMETER 6" SS | BORING NO. 15

DRILL RIG CCD - Tractor Rig | HAMMER TYPE 140-lb Hammer with Pulley

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1			**FAT CLAY:** dark grayish brown (10YR 4/2) with black (10YR 2/1), high plasticity, trace rootlets, moist, stiff	**CH**								
1	15-1 L				3							
2		2			7							
2		1			9	10		25.5	71.8		50	
3			brown (10YR 5/3), trace iron-oxide staining, moist, stiff		3							
3	15-2 T				5							
4					10	15						
5												
5	15-3 L		gray (10YR 5/1), increase in iron-oxide staining, moist, stiff		3							
6		2			8		1.5					
6		1			10	12		35.5	83.5			
7			Boring terminated at 6½ feet. No groundwater encountered.									
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

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Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 21
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/3/24 | BORING DIAMETER 6" SS | BORING NO. 16

DRILL RIG CCD - Tractor Rig | HAMMER TYPE 140-lb Hammer with Pulley

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1	16-1 L		**FAT CLAY:** black (10YR 2/1), with black (10YR 2/1), exhibits high plasticity, trace iron-oxide staining, moist, stiff	CH	3							
2		2			4							
		1			6	7		27.3	80.2			
3	16-2 T		light grayish brown (10YR 6/2), scattered iron-oxide staining, moist, stiff	CH	1							
4					4							
					5	9						
5	16-3 L				4							
6		2			8		2.0					
		1	increase in iron-oxide staining, moist, stiff		10	12		36.5	27.3			
7			Boring terminated at 6½ feet. No groundwater encountered.									

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Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 22
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/3/24 | BORING DIAMETER 6'' SS | BORING NO. P1

DRILL RIG CCD - Tractor Rig | HAMMER TYPE 140-lb Hammer with Pulley

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1	P1-B1	B	**CLAY:** black (10YR 2/1), exhibits moderate plasticity, moist	**Cl**								
2												
3	P1-B2	B	**SANDY CLAY:** brown (10YR 5/3), exhibits moderate plasticity, fine grained, moist	**Cl**				26.7		70.6		0.0% Gravel 29.4% Sand 70.6% Fines
4												
5			Boring terminated at 5 feet. No groundwater encountered.									
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 23
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/3/24 | BORING DIAMETER 6" SS | BORING NO. P2

DRILL RIG CCD - Tractor Rig | HAMMER TYPE 140-lb Hammer with Pulley

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1			**CLAY:** black (10YR 2/1), exhibits moderate plasticity, scattered rootlets, moist	**CL**								
2	P2-B1	B										
3			**SANDY FAT CLAY:** gray (10YR 5/1), exhibits high plasticity, iron-oxide staining, moist	**CH**								0.3% Gravel 30.6% Sand 69.0% Fines
4	P2-B2	B						23.9		69.0		
5			**POORLY GRADED SAND:** brownish yellow (10YR 6/6), fine grained, subangular to subrounded, composed of quartz, feldspar, and mafics, massive, moist	**SP**								
6			Boring terminated at 5 feet. No groundwater encountered.									
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 24
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/3/24 | BORING DIAMETER 6" SS | BORING NO. P3

DRILL RIG CCD - Tractor Rig | HAMMER TYPE 140-lb Hammer with Pulley

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1	P3-B1	B	**CLAY:** black (10YR 2/1), exhibits moderate plasticity, trace rootlets, moist	CL								
2												
3	P3-B2	B	**CLAYEY SAND:** pale brown (10YR 6/3), fine grained, subangular to subrounded, composed of quartz, feldspar, and mafics, exhibits moderate plasticity, moist	SC				16.3		36.9		1.1% Gravel 62.0% Sand 36.9% Fines
4												
5			Boring terminated at 5 feet. No groundwater encountered.									
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 25
Project No. 2219
Date: 6/13/24

LOGGED BY MP DATE DRILLED 4/3/24 BORING DIAMETER 6" SS BORING NO. P4

DRILL RIG CCD - Tractor Rig HAMMER TYPE 140-lb Hammer with Pulley

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1			**LEAN CLAY:** black (10YR 2/1), exhibits moderate plasticity, trace rootlets, moist	**CL**								
1	P4-B1	B										
2												
3			**FAT CLAY:** brown (10YR 5/3), exhibits high plasticity, moist	**CH**								2.0% Gravel 6.8% Sand 91.2% Fines
4	P4-B2	B						32.2		91.2		
5												
6			Boring terminated at 5 feet. No groundwater encountered.									
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 26
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/3/24 | BORING DIAMETER 6" SS | BORING NO. P5

DRILL RIG CCD - Tractor Rig | HAMMER TYPE 140-lb Hammer with Pulley

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1	P5-B1	B	**LEAN CLAY:** black (10YR 2/1), exhibits moderate plasticity, scattered rootlets, moist	CL								
2												
3	P5-B2	B	**FAT CLAY WITH SAND:** brown (10YR 5/3), exhibits high plasticity, iron-oxide staining, moist	CH				26.3		73.0		0.7% Gravel 26.3% Sand 73.0% Fines
4												
5			Boring terminated at 5 feet. No groundwater encountered.									
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 27
Project No. 2219
Date: 6/13/24

LOGGED BY MP | DATE DRILLED 4/3/24 | BORING DIAMETER 6" SS | BORING NO. P6

DRILL RIG CCD - Tractor Rig | HAMMER TYPE 140-lb Hammer with Pulley

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1	P6-B1	B	**LEAN CLAY:** black (10YR 2/1), exhibits moderate plasticity, scattered rootlets, moist	**CL**								
2												
3	P6-B2	B	**SANDY FAT CLAY:** brown (10YR 5/3), exhibits high plasticity, fine grained, subangular to subrounded, composed of quartz, feldspar, and mafics, moist	**CH**				19.1		56.9		0.6% Gravel 42.6% Sand 56.9% Fines
4												
5			Boring terminated at 5 feet. No groundwater encountered.									
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 28
Project No. 2219
Date: 6/13/24

LOGGED BY MP DATE DRILLED 4/3/24 BORING DIAMETER 6'' SS BORING NO. P7

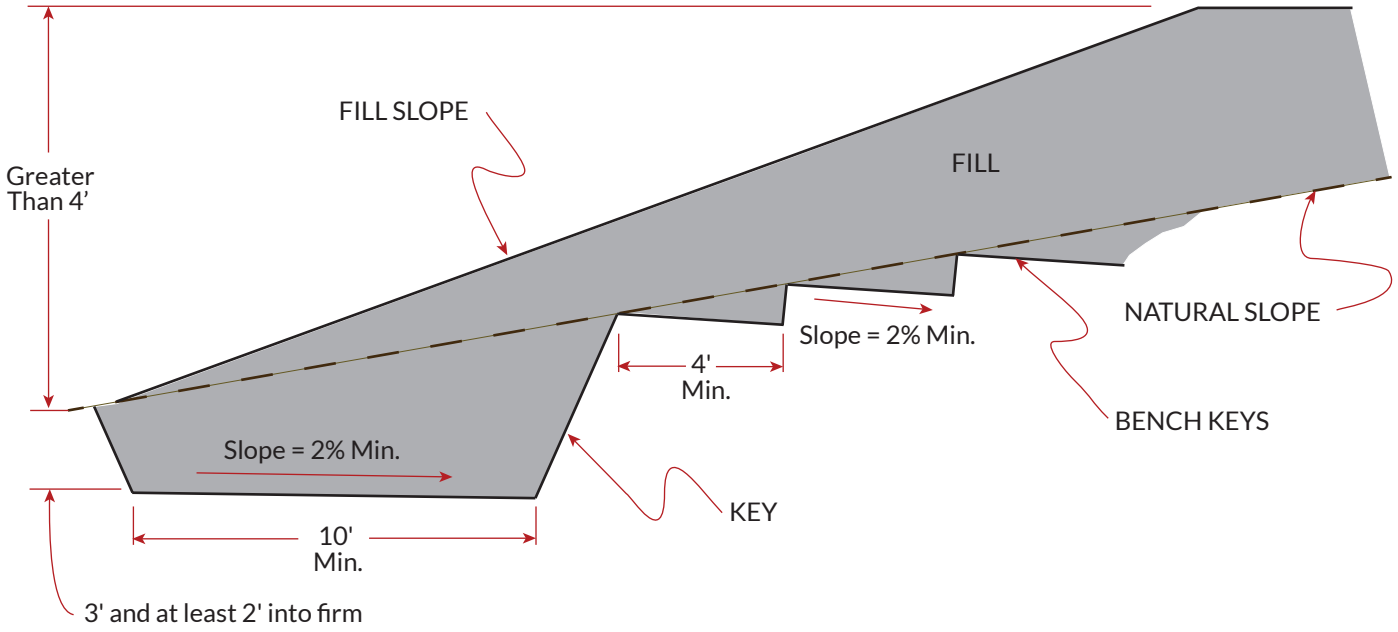
DRILL RIG CCD - Tractor Rig HAMMER TYPE 140-lb Hammer with Pulley

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1	P7-B1	B	**LEAN CLAY:** black (10YR 2/1), exhibits moderate plasticity, trace rootlets, moist	CL								
3	P7-B2	B	**FAT CLAY WITH SAND:** brown (10YR 5/3), exhibits high plasticity, moist	CH				20.3		78.0		0.0% Gravel 22.0% Sand 78.0% Fines
5			Boring terminated at 5 feet. No groundwater encountered.									

Pacific Crest ENGINEERING INC

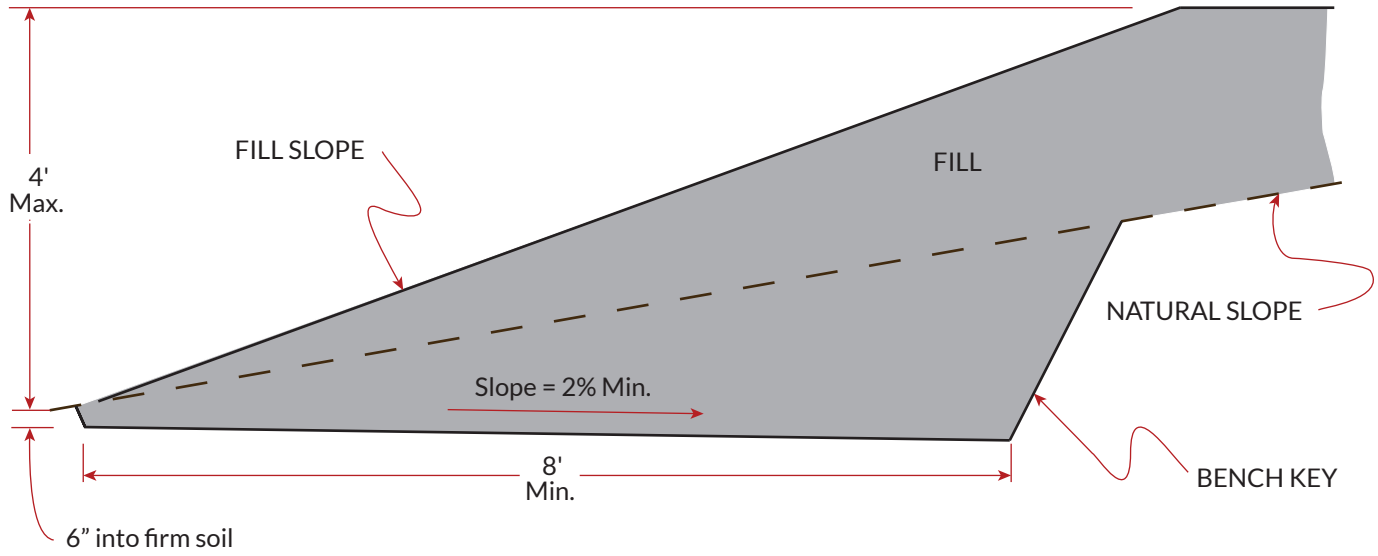
Log of Test Borings
Community Harvest Project
Watsonville, California

Figure No. 29
Project No. 2219
Date: 6/13/24



TYPICAL KEYWAY FILL - FILL SLOPES GREATER THAN 4 FEET

not to scale



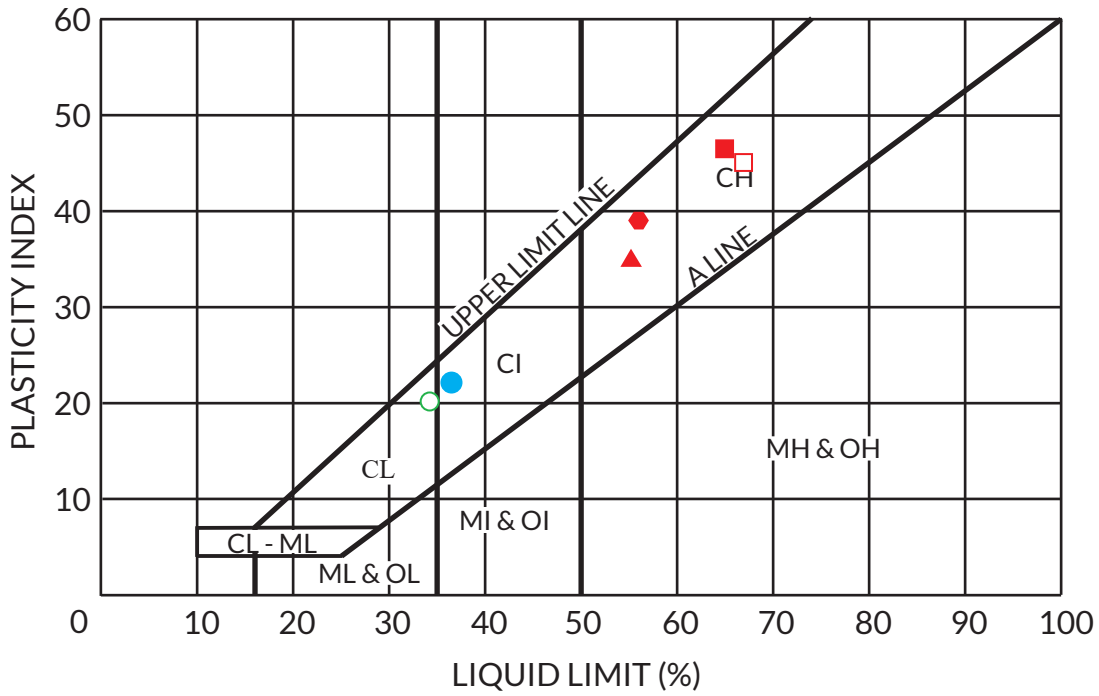
TYPICAL BENCH FILL - FILL SLOPES NO GREATER THAN 4 FEET

not to scale

Pacific Crest ENGINEERING INC	**Keyway/Bench Detail** Community Harvest Project Watsonville, California	Figure No. 30 Project No. 2219 Date: 6/13/24

ATTERBERG LIMITS - ASTM D4318

PLASTICITY CHART



*This chart has been modified to include the intermediate classifications CI, MI and OI for clays and silts with liquid limits between 35 and 50.

SYMBOL	SAMPLE #	LL (%)	PL (%)	PI
●	1-2	37	14	23
■	2-3	65	18	46
▲	4-1-2	55	20	35
⬢	6-2	56	17	39
○	6-5	34	13	21
□	7-4	67	22	45

EXPANSION INDEX - ASTM D4829

SAMPLE #	EI	EXPANSION POTENTIAL
1-1-1	78	Medium
3-1-1	50	Low
5-1-1	98	High
7-1-1	59	Medium

EXPANSION POTENTIAL	
0 - 20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High

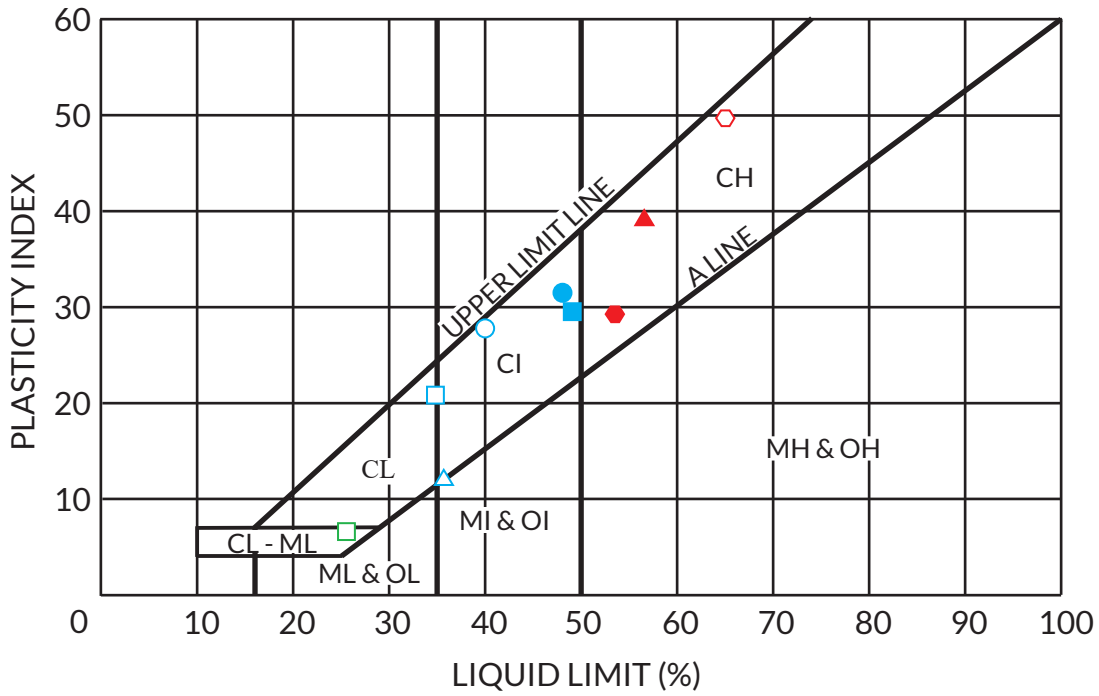
Pacific Crest ENGINEERING INC

Atterberg Limits/Expansion Index
Community Harvest Project
Watsonville, California

Figure No. 31
Project No. 2219
Date: 6/13/2024

ATTERBERG LIMITS - ASTM D4318

PLASTICITY CHART



*This chart has been modified to include the intermediate classifications CI, MI and OI for clays and silts with liquid limits between 35 and 50.

SYMBOL	SAMPLE #	LL (%)	PL (%)	PI
●	8-1-2	47	16	31
■	8-2	49	20	30
▲	8-5	56	24	32
⬢	9-1-1	53	24	29
○	11-2	40	12	28
□	12-2	25	19	6
□	13-1-1	35	13	22
△	14-1-2	31	19	12
⬡	15-1-1	65	15	50

Corrosivity Test Summary

CTL #	416-716	**Date:**	4/18/2024	**Tested By:**	PJ	**Checked:**	PJ
Client:	Pacific Crest Engineering Inc	**Project:**	Hanson Slough Recreation Area			**Proj. No:**	2219
Remarks:							

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate		pH	ORP	Moisture	
Boring	**Sample, No.**	**Depth, ft.**	**As Rec.**	**Minimum**	**Saturated**	**mg/kg**	**mg/kg**	**%**		(Redox)	At Test	**Soil Visual Description**
						Dry Wt.	Dry Wt.	Dry Wt.		mv	%	
			ASTM G57	Cal 643	ASTM G57	Cal 422-mod.	Cal 417-mod.	Cal 417-mod.	Cal 643	SM 2580B	ASTM D2216	
10-2	-	-	-	1344	-	10	51	0.0051	9.0	-	4.6	Dark Gray CLAY w / Sand
5-2T	-	-	-	738	-	91	311	0.0311	8.5	-	8.9	Olive Brown CLAY w / Sand
14-2T	-	-	-	754	-	128	231	0.0231	8.2	-	5.3	Yellowish Brown CLAY w / Sand

Resistivity	Ohm-cm
Very Corrosive	0-1000
Corrosive	1,000-2,000
Fairly Corrosive	2,000-5,000
Mildly Corrosive	5,000-10,000
Negligible	>10,000

Chloride Concentration	mg/kg
Severe	>1,500
Positive	300-1,500
Negligible	0-300

Sulfate Concentration	mg/kg
Severe	>5,000
Considerable	2,000-5,000
Positive	1,000-2,000
Negligible	0-1,000

pH	
Potential for acid attack on concrete and steel	<5.5

Pacific Crest ENGINEERING INC

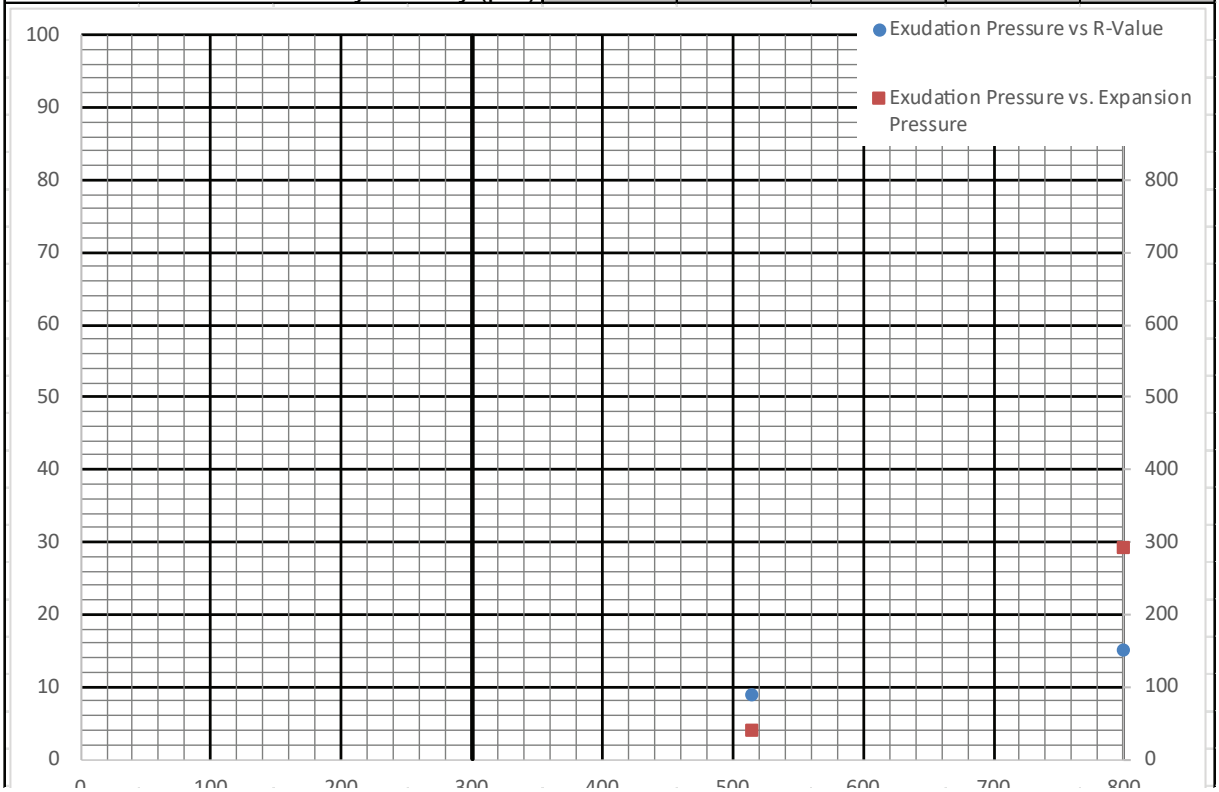
Corrosivity Test Summary
Community Harvest Project
Watsonville, California

Figure No. 33
Project No. 2219
Date: 6/13/2024

R-Value
CTM 301

CTL Job No.:	416-718	Boring:		Reduced By:	RU
Client:	Pacific Crest Engineering	Sample:	B-3	Checked By:	PJ
Project Number:	2219	Depth:		Date:	4/17/2024
Project Name:	Hanson Slough Recreation Area			**R-Value**	**<5**
Soil Description:	Olive Gray CLAY w/ Gravel				
Remarks:	Soil extruded from the mold giving a false exudation pressure (exudation pressures for Specimens A & B are greater than the values reported). Per Calrans, the R-value test was terminated and an R-value of less than 5 was reported.			**Expansion Pressure**	

Specimen Designation	A	B	C	D	E
Compactor Foot Pressure (psi)	100	70			
Exudation Pressure (psi)	800	514			
Exudation Load (lbf)	10053	6459			
Height After Compaction (in)	2.65	2.76			
Expansion Pressure (psf)	292	39			
Stabilometer @ 2000	132	138			
Turns Displacement	3.33	4.56			
R-value	14	8			
Corrected R-Value	15	9			
Moisture Content (%)	21.4	23.3			
Wet Density (pcf)	124.9	122.8			
Dry Density (pcf)	102.9	99.6			



Pacific Crest ENGINEERING INC

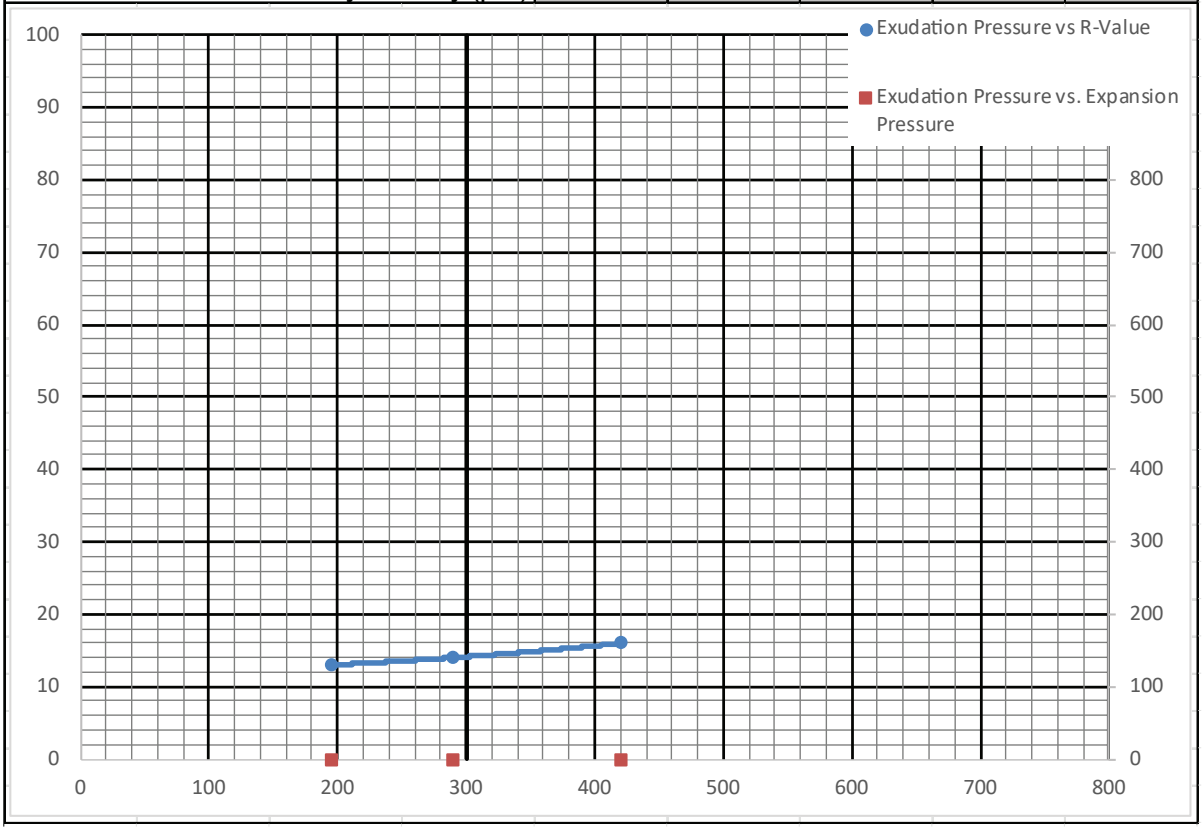
R-Value Test Results
Community Harvest Project
Watsonville, California

Figure No. 34
Project No. 2219
Date: 6/13/2024

R-Value
CTM 301

CTL Job No.:	416-718	Boring:		Reduced By:	RU
Client:	Pacific Crest Engineering	Sample:	B-9	Checked By:	PJ
Project Number:	2219	Depth:		Date:	4/17/2024
Project Name:	Hanson Slough Recreation Area			**R-Value**	**14**
Soil Description:	Olive Brown Sandy CLAY				
Remarks:				**Expansion Pressure**	**0**

Specimen Designation	A	B	C	D	E
Compactor Foot Pressure (psi)	130	150	130		
Exudation Pressure (psi)	195	421	289		
Exudation Load (lbf)	2450	5290	3632		
Height After Compaction (in)	2.67	2.61	2.34		
Expansion Pressure (psf)	0	0	0		
Stabilometer @ 2000	138	132	134		
Turns Displacement	3.02	2.95	2.70		
R-value	12	15	15		
Corrected R-Value	13	16	14		
Moisture Content (%)	22.2	18.9	19.9		
Wet Density (pcf)	124.1	127.9	129.3		
Dry Density (pcf)	101.6	107.5	107.8		



Pacific Crest ENGINEERING INC

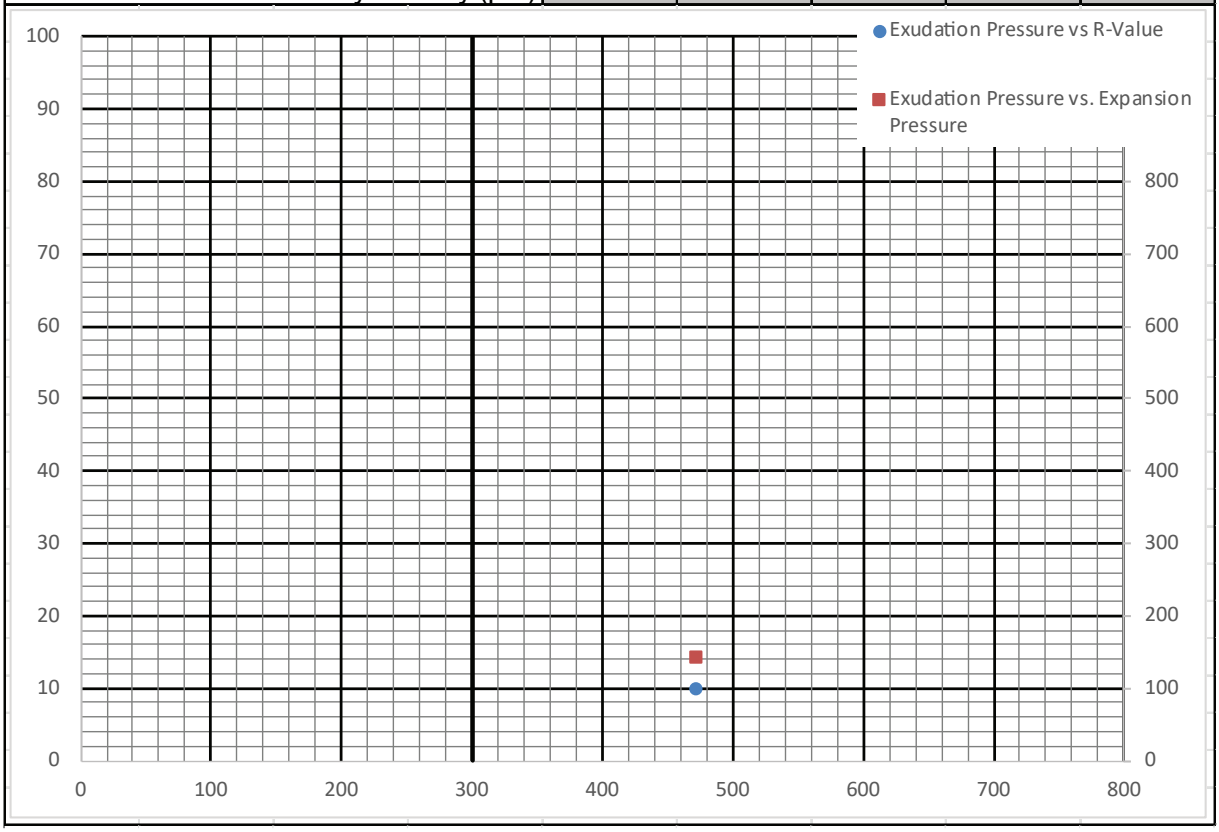
R-Value Test Results
Community Harvest Project
Watsonville, California

Figure No. 35
Project No. 2219
Date: 6/13/2024

R-Value
CTM 301

CTL Job No.:	416-718	Boring:		Reduced By:	RU
Client:	Pacific Crest Engineering	Sample:	B-11	Checked By:	PJ
Project Number:	2219	Depth:		Date:	4/17/2024
Project Name:	Hanson Slough Recreation Area		**R-Value**		**<5**
Soil Description:	Olive Yellow CLAY w/ Gravel, trace organics				
Remarks:	Soil extruded from the mold giving a false exudation pressure. Per Calrans, the R-value test was terminated and an R-value of less than 5 was reported.		**Expansion Pressure**		

Specimen Designation	A	B	C	D	E
Compactor Foot Pressure (psi)	60				
Exudation Pressure (psi)	471				
Exudation Load (lbf)	5919				
Height After Compaction (in)	2.69				
Expansion Pressure (psf)	142				
Stabilometer @ 2000	140				
Turns Displacement	3.70				
R-value	9				
Corrected R-Value	10				
Moisture Content (%)	20.0				
Wet Density (pcf)	132.1				
Dry Density (pcf)	110.1				



Pacific Crest ENGINEERING INC

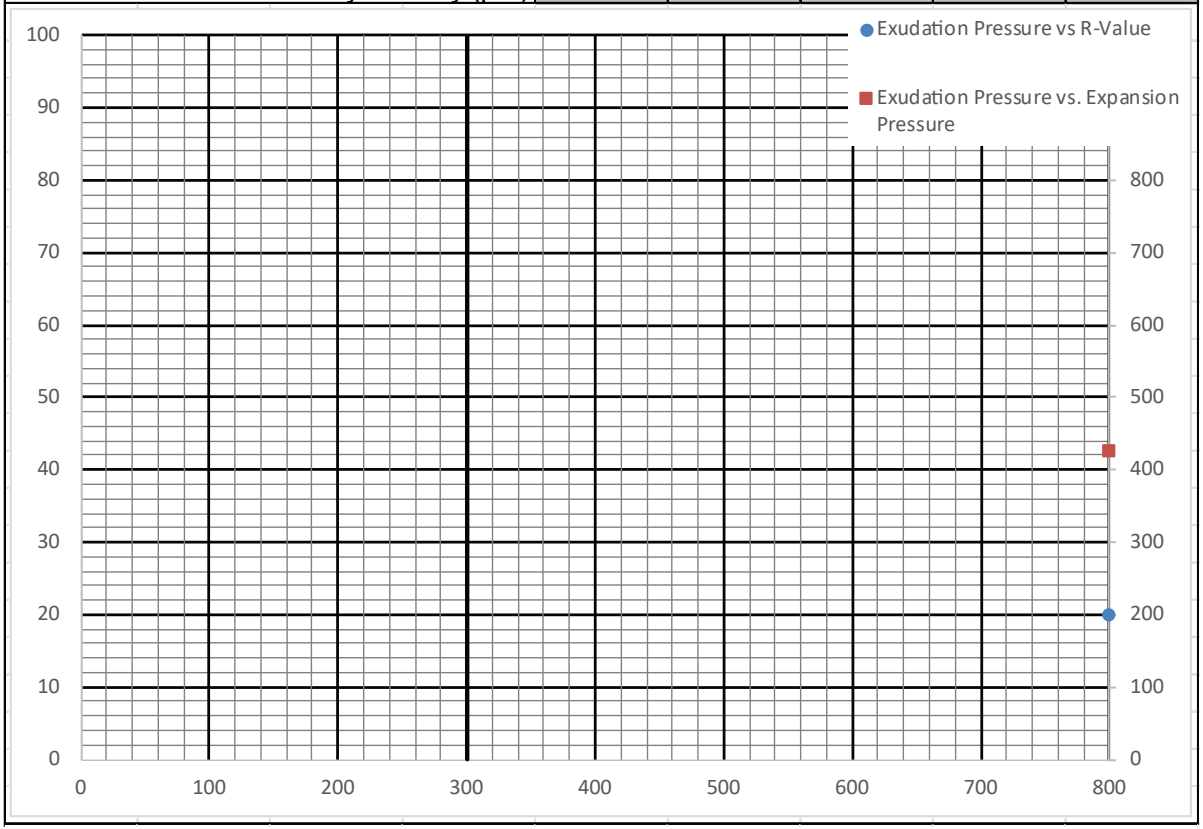
R-Value Test Results
Community Harvest Project
Watsonville, California

Figure No. 36
Project No. 2219
Date: 6/13/2024

R-Value
CTM 301

CTL Job No.:	416-718	Boring:		Reduced By:	RU
Client:	Pacific Crest Engineering	Sample:	B-16	Checked By:	PJ
Project Number:	2219	Depth:		Date:	4/17/2024
Project Name:	Hanson Slough Recreation Area		**R-Value**		**<5**
Soil Description:	Olive Greenish Brown CLAY w/ Gravel				
Remarks:	Soil extruded from the mold giving a false exudation pressure (exudation pressure for Specimen A is greater than the values reported). Per Calrans, the R-value test was terminated and an R-value of less than 5 was reported.		**Expansion Pressure**		

Specimen Designation	A	B	C	D	E
Compactor Foot Pressure (psi)	200				
Exudation Pressure (psi)	800				
Exudation Load (lbf)	10053				
Height After Compaction (in)	2.51				
Expansion Pressure (psf)	426				
Stabilometer @ 2000	128				
Turns Displacement	2.50				
R-value	20				
Corrected R-Value	20				
Moisture Content (%)	26.0				
Wet Density (pcf)	124.6				
Dry Density (pcf)	98.9				



Pacific Crest ENGINEERING INC

R-Value Test Results
Community Harvest Project
Watsonville, California

Figure No. 37
Project No. 2219
Date: 6/13/2024

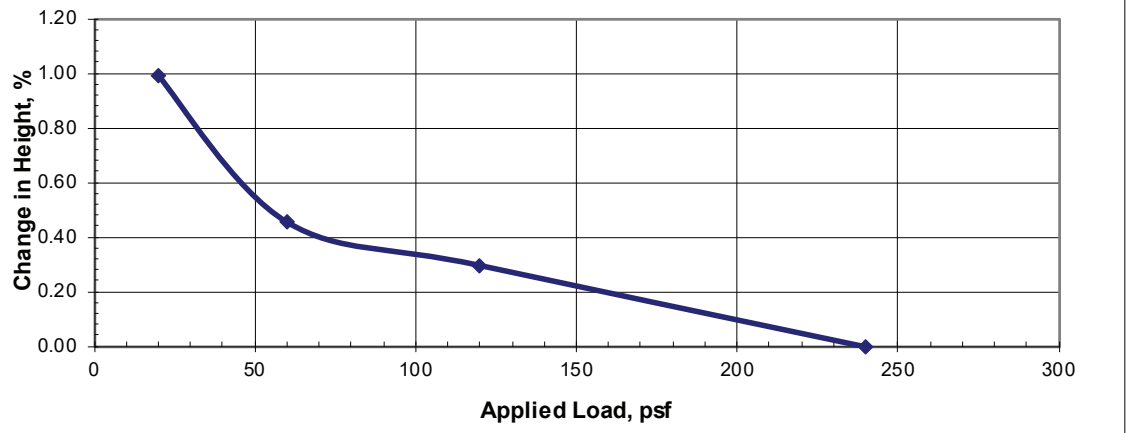
Shrink-Swell / Expansion Pressure
ASTM D 3877m

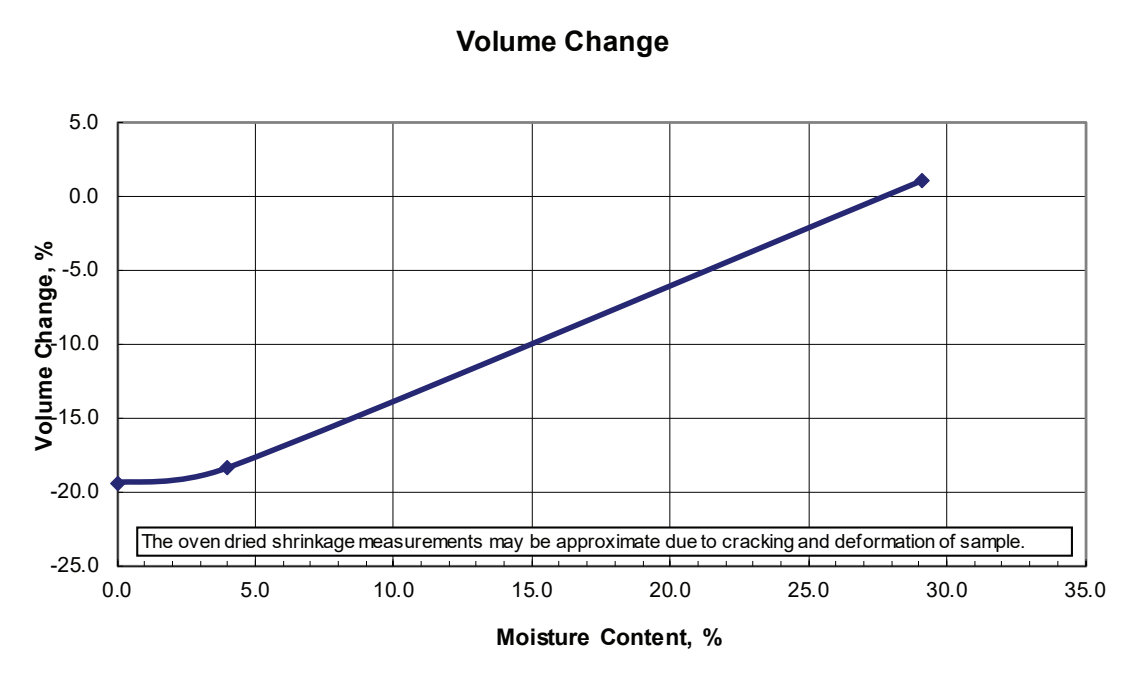
Job No.:	416-719		**LL**		**Date:**	5/1/2024	
Client:	Pacific Crest Engineering		**PL**		**By:**	MD	
Project:	2219		**PI**		**Checked By:**	DC	Assumed / Determined
Boring:		**Sample:** 10-1-1	**Depth,ft:**		**Specific Gravity:**	2.7	
Soil Desc.	Dark Gray CLAY						

Load, psf:	240	120	60	20
Exp., %	0.00	0.30	0.45	0.99

	Field	Saturated	Air-Dry	Oven-Dry
Moisture %:	26.2	29.1	4.0	0.0
Dry Density, pcf	95.2	94.2	116.7	118.1
Saturation, %	91.4	99.4	24.3	0.0
Void Ratio	0.772	0.790	0.446	0.428
Volume Change, %	0.0	1.0	-18.4	-19.4

Remarks:





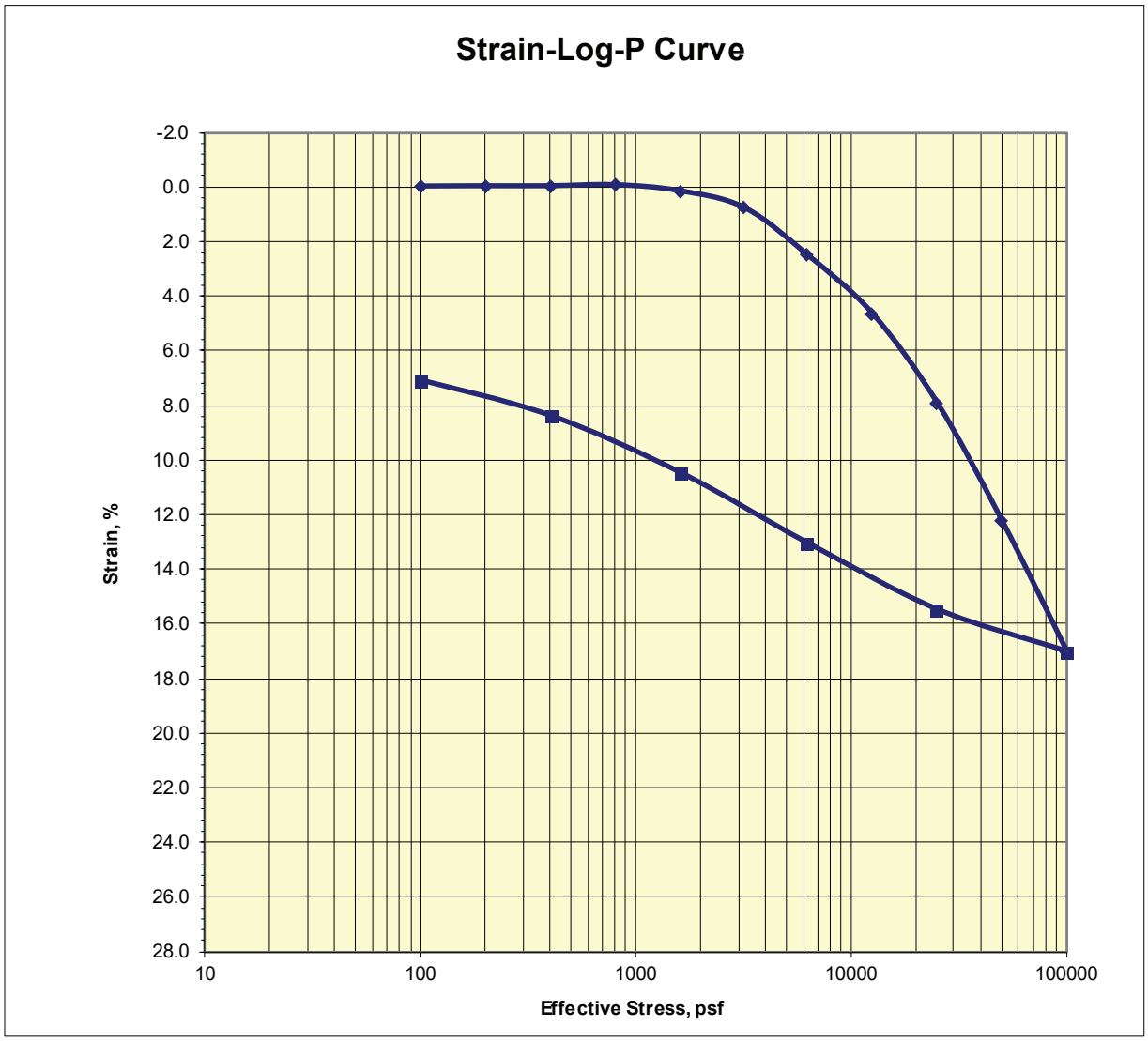
Pacific Crest ENGINEERING INC

Shrink/Swell Test Results
Community Harvest Project
Watsonville, California

Figure No. 38
Project No. 2219
Date: 6/13/2024

Consolidation Test
ASTM D2435

Job No.:	416-717	**Boring:**		**Run By:**	HM
Client:	Pacific Crest Engineering	**Sample:**	10-4-1	**Reduced:**	RU
Project:	2219	**Depth, ft.:**		**Checked:**	PJ
Soil Type:	Olive Brown CLAY w/ Sand & Gravel			**Date:**	4/25/2024



Assumed Gs 2.7	Initial	Final
Moisture %:	24.8	22.5
Dry Density, pcf:	97.3	104.8
Void Ratio:	0.732	0.608
% Saturation:	91.6	100.0

Remarks:

Pacific Crest ENGINEERING INC

Consolidation Test Results
Community Harvest Project
Watsonville, California

Figure No. 39
Project No. 2219
Date: 6/13/2024

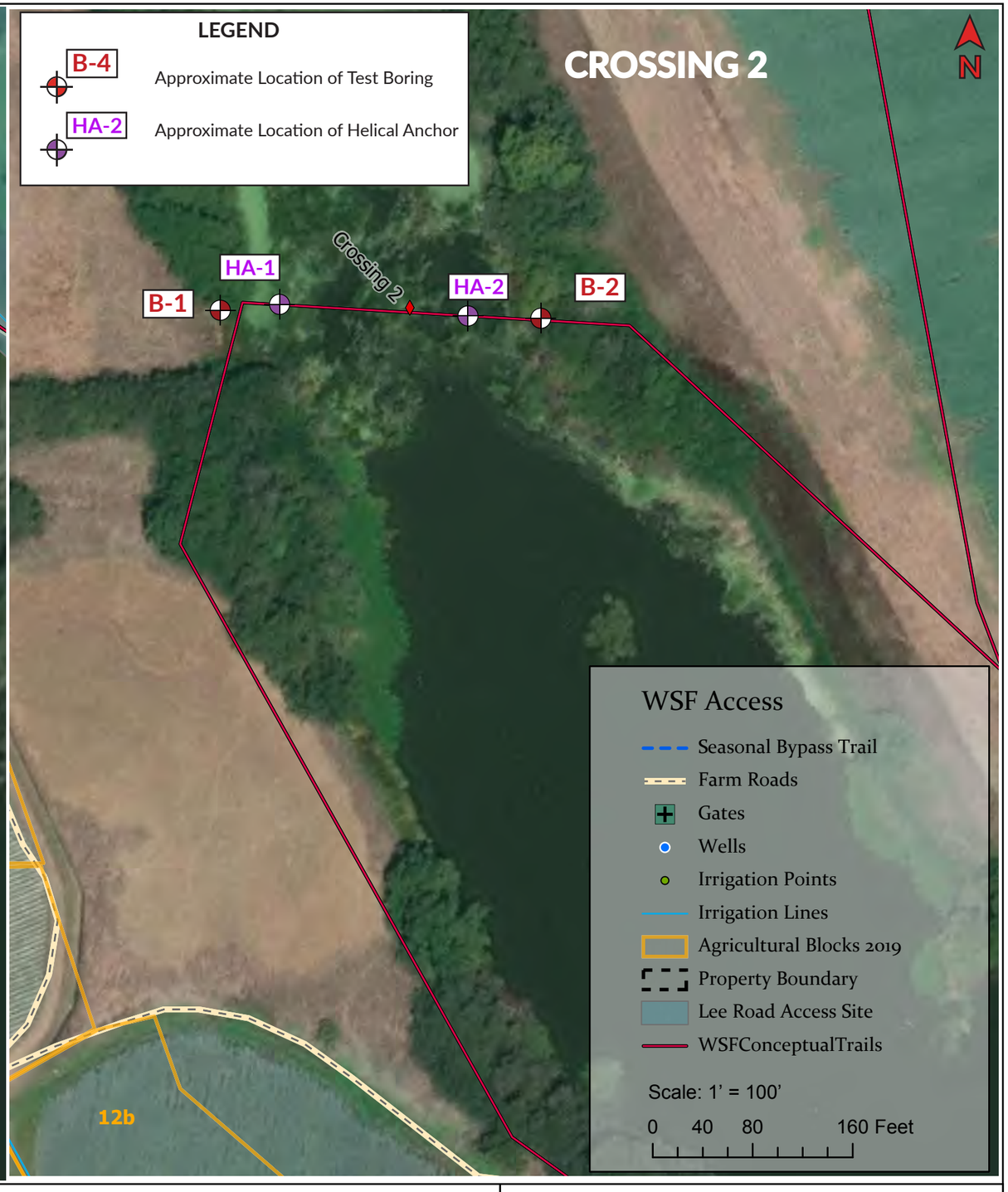
APPENDIX B

Boring Logs from 2020 Report

Base Maps: WSF Access Crossing One and WSF Access Crossing Two, Prepared by
Land Trust of Santa Cruz County

CROSSING 1

CROSSING 2



Pacific Crest ENGINEERING INC

Site Map Showing Test Boring Locations
Hanson Slough Boardwalks
Watsonville, California

Figure No. 2
Project No. 19141
Date: 10/5/2020

LOGGED BY CLA | DATE DRILLED 8/9/20 | BORING DIAMETER 8" HS | BORING NO. 1

DRILL RIG Britton Track Mounted CME 55 | HAMMER TYPE Auto-Trip

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1			**SANDY CLAY:** Very dark gray (10YR 3/1), clay appears to exhibit intermediate plasticity, fine to medium grained quartz sand, sub-angular to sub-rounded shaped, poorly graded, very moist, soft	CL								
2	1-1 L	2			2							
3		1			2 3	4						
4												
5	1-2 T		**CLAY WITH SAND:** Gray (2.5Y 5/1) and light olive brown (2.5Y 5/3), clay appears to exhibit intermediate plasticity, very fine to fine grained sand with trace medium grains, poorly graded, moist, firm	CL	2 3							
6					4	7	1.25	18.8			32	Atterberg Limits LL = 46% PL = 14%
7			▼									
8			Gravelly drilling at 8 feet									
9												
10	1-3 L		Moist, very stiff		8 16							
11		1	**SAND:** Yellowish brown (10YR 5/6), fine to medium grained, sub-angular to sub-rounded shaped, poorly graded, clean, very moist to slightly wet, medium dense	SP	18	18	2.5	16.8	112.1			
12												
13												
14												
15	1-4 T		Wet, medium dense		8 12							
16					13	25		21.8		4.7		
17			Easy drilling to 17 feet									
18			Increase in drilling resistance at 17 feet **LEAN CLAY WITH SAND:**	CL								
19												
20	1-5 L		Light olive brown (2.5Y 5/4), fine grained sand with trace medium grains, poorly graded, moist, hard		9							Atterberg Limits LL = 22% PL = 13%
21		2			22		+4.5				9	
22		1			26	32	+4.5	12.0	123.8	50.1		Qu = 14,377 psf
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Hanson Slough Boardwalks
Watsonville, California

Figure No. 5
Project No. 19141
Date: 10/5/20

LOGGED BY CLA DATE DRILLED 8/9/20 BORING DIAMETER 8" HS BORING NO. 1

DRILL RIG Britton Track Mounted CME 55 HAMMER TYPE Auto-Trip

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
24			Gravelly drilling at 24½ feet									
25	1-6 T		**SAND WITH SILT AND GRAVEL:** Yellowish brown 10YR 5/4), fine to very coarse grained, angular to rounded shaped, poorly graded, angular to rounded shaped gravels up to 2 inches in diameter, wet, dense	SP-SM	17							
26					23							34.1% Gravel
27			Hard, smooth drilling at 27 feet		20	43		16.0		8		57.9% Sand
28			**FAT CLAY:** Very dark greenish gray (GLEY 1 3/10GY), trace very fine grained sand, moist, very stiff	CH								
29												
30	1-7 L				8							
31		2			12		4.0					
32		1			16	21	+4.5	33.9	87.9	99.9		
33												
34												
35	1-8 T		Moist, very stiff		4							
36					6							
37					9	15						
38												
39												
40	1-9 L		Moist, very stiff		5							
41		2			14		+4.5					Atterberg Limits LL = 44%
42		1			25	27	+4.5	22.0	100.2		24	PL = 19% Qu = 8,842 psf
43												
44												
45	1-10 T		Moist, very stiff		3							
46					7							
					13	20						

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Log of Test Borings
Hanson Slough Boardwalks
Watsonville, California

Figure No. 6
Project No. 19141
Date: 10/5/20

LOGGED BY CLA DATE DRILLED 8/9/20 BORING DIAMETER 8" HS BORING NO. 1

DRILL RIG Britton Track Mounted CME 55 HAMMER TYPE Auto-Trip

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
47			**FAT CLAY:** Very dark greenish gray (GLEY 1 3/10GY), slightly silty, moist, very stiff	CH								
48												
49												
50	1-11 L				7							
		2			17		+4.5					
51		1			23	28	+4.5	33.8	86.9			Qu = 8,281 psf
52			Boring terminated at 51½ feet. Groundwater initially encountered at 11½ feet. Measured at 7 feet at the end of drilling.									
53												
54												
55												
56												
57												
58												
59												
60												
61												
62												
63												
64												
65												
66												
67												
68												
69												

Pacific Crest ENGINEERING INC

Log of Test Borings
Hanson Slough Boardwalks
Watsonville, California

Figure No. 7
Project No. 19141
Date: 10/5/20

LOGGED BY CLA | DATE DRILLED 8/9/20 | BORING DIAMETER 8" HS | BORING NO. 2

DRILL RIG Britton Track Mounted CME 55 | HAMMER TYPE Auto-Trip

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1			**SANDY LEAN CLAY/CLAYEY SAND:** Black (10YR 2/1), very fine to fine grained, poorly graded, organic rich, slightly moist, firm/very loose	CL/SC								
2	2-1 L				5							
3		2			3		2.5					
		1			4	6/3	2.5					
4												
5	2-2 T		**CLAY:** Mottled dark gray (7.5YR 4/1) and strong brown (7.5YR 4/6), clay appears to exhibit intermediate plasticity, trace very fine grained sand, moist, firm	Cl	2							
6					2							
					3	5	0.9	31.7				
7			▼									
8												
9												
10	2-3 L		Moist, firm		2							
		2			8							17.7% Gravel
11		1	**CLAYEY SAND WITH GRAVEL:** Very pale brown (10YR 7/4) and strong brown (7.5YR 5/8), very fine to fine grained, poorly graded, sub-angular to sub-rounded shaped gravels up to 1 inch in diameter, moist, medium dense	SC	30	20	3.75	16.5	115.0	27.4		54.9% Sand
12												
13												
14												
15	2-4 T		**CLAY:** Light yellowish brown (2.5Y 6/3), clay appears to exhibit intermediate plasticity, trace oxidation patches, slightly silty, trace wet sand lense, moist, very stiff	Cl	2							
16					9							
					15	24		36.6				
17												
18			Increase in drilling resistance at 18 feet									
			SANDY LEAN CLAY/CLAYEY SAND: Dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6), fine grained sand, poorly graded, trace rounded sandstone gravels up to ½ inch in diameter, very moist, hard/medium dense	CL/SC								
19												
20	2-5 L				11							
		2			21							
21		1			29	33	+4.5	12.3	123.8	49.1		Qu = 14,077 psf
22												
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Hanson Slough Boardwalks
Watsonville, California

Figure No. 8
Project No. 19141
Date: 10/5/20

LOGGED BY CLA DATE DRILLED 8/9/20 BORING DIAMETER 8" HS BORING NO. 2

DRILL RIG Britton Track Mounted CME 55 HAMMER TYPE Auto-Trip

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
24			**SAND WITH CLAY AND GRAVEL:** Light olive brown (2.5Y 5/4), fine to medium grained with trace coarse grains, sub-angular to sub-rounded shaped, poorly graded, trace sub-rounded shaped siltstone and sandstone gravels up to ½ inch in diameter, wet, very dense	SP-SC								
25	2-6 T				28							
26					26 45	71		15.8		8.3		22.9% Gravel 68.8% Sand
27												
28												
29												
30	2-7 L		**FAT CLAY:** Very dark greenish gray (GLEY 1 3/10GY), slightly silty, moist, very stiff	CH	7							
31		2 1			11 14	18	+4.5 +4.5	34.0	88.5			Qu = 7,429 psf
32												
33												
34												
35	2-8 T		Trace discontinuous very fine grained sand lenses scattered throughout the sample, moist, very stiff		4 7							
36					10	17						
37												
38												
39												
40	2-9 L		**FAT CLAY WITH SAND:** Very dark greenish gray (GLEY 1 3/10GY), very fine grained, poorly graded, moist, very stiff	CH	8							
41		2 1			15 23	29	+4.5	23.8	102.4	75.2		Qu = 6,256 psf
42												
43												
44												
45	2-10 T		**FAT CLAY:** Very dark greenish gray (GLEY 1 3/10GY), slightly silty, relict organics scattered throughout the sample, moist, very stiff	CH	4							
46					7 10	17						

Pacific Crest ENGINEERING INC

Log of Test Borings
Hanson Slough Boardwalks
Watsonville, California

Figure No. 9
Project No. 19141
Date: 10/5/20

LOGGED BY CLA DATE DRILLED 8/9/20 BORING DIAMETER 8" HS BORING NO. 2

DRILL RIG Britton Track Mounted CME 55 HAMMER TYPE Auto-Trip

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
47			**FAT CLAY:** Very dark greenish gray (GLEY 1 3/10GY), slightly silty, moist, very stiff	CH								
48												
49												
50	2-11 L				8							
51		2			14		+4.5					
		1			25	27	+4.5	26.7	99.7			Qu = 11,945 psf
52			Boring terminated at 51½ feet. Groundwater initially encountered at 11½ feet. Measured at 7 feet at the end of drilling.									
53												
54												
55												
56												
57												
58												
59												
60												
61												
62												
63												
64												
65												
66												
67												
68												
69												

Pacific Crest ENGINEERING INC

Log of Test Borings
Hanson Slough Boardwalks
Watsonville, California

Figure No. 10
Project No. 19141
Date: 10/5/20

LOGGED BY CLA | DATE DRILLED 8/9/20 | BORING DIAMETER 8" HS | BORING NO. 3

DRILL RIG Britton Track Mounted CME 55 | HAMMER TYPE Auto-Trip

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
1	3-1 L	2	**FILL; CLAYEY SAND:** Very dark gray (10YR 3/1), fine grained with trace medium to coarse grains, poorly graded, clay appears to exhibit low plasticity, trace sub-angular shaped gravels up to ½ inch in diameter, moist, medium dense	SC	11							
		1			12							
2					11	12						
			NATIVE; ORGANIC LEAN CLAY, PEAT: Black (10YR 2/1), organic rich, scattered rootlets, moist, +very soft	OL								
3			▼									
4												
5	3-2 T		Moist, soft		2							
6					1							
					1	2						
7			Strong hydrogen sulfide odor, organic rich									
8												
9												
10	3-3 L	2	Moist, soft		1							
					1			273.1	17.6			
11		1			2	3	0.75					
12												
13												
14												
15	3-4 T		**SANDY FAT CLAY:** Very dark gray (10YR 3/1), very fine grained sand, wet, soft	CH	2							
					1							
16					1	2		30.4				
17												
18			Increase in drilling resistance at 18 feet									
			CLAYEY SAND: Yellowish brown (10YR 5/4), fine grained, poorly graded, clay exhibits intermediate plasticity, wet, loose	SC								
19												
20	3-5 L	2			5							
					6							
21		1			8	7	3.0	22.1	104.2	35.1		
22												
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Hanson Slough Boardwalks
Watsonville, California

Figure No. 11
Project No. 19141
Date: 10/5/20

LOGGED BY CLA DATE DRILLED 8/9/20 BORING DIAMETER 8" HS BORING NO. 3

DRILL RIG Britton Track Mounted CME 55 HAMMER TYPE Auto-Trip

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
24			**SILTY SAND:** Yellowish brown (10YR 5/6), fine grained, poorly graded, quartz rich, wet, loose	SM								
25	3-6	T			2							
26					2 5	7		32.3		26.3		
27												
28												
29												
30	3-7	L	**CLAYEY SAND WITH GRAVEL:** Yellowish brown (10YR 5/4), fine grained gravel, sub-angular to sub-rounded shaed, poorly graded, clay appears to exhibit low plasticity, trace gravels up to 1 inch in diameter, wet, medium dense	SC	4							
31		2 1			10 14	13		18.3	108.3	29.7		29.9% Gravel 40.8% Sand
32												
33												
34												
35	3-8	T	**SAND WITH SILT:** Yellowish brown (10YR 5/4), fine grained with trace medium grains, poorly graded, quartz rich, clay lens approximately 2 inches thick at 35 feet, wet, dense	SM	10							
36					10 22	32		24.9		9.8		
37												
38												
39												
40	3-9	L	**SANDY FAT CLAY:** Very dark greenish gray (GLEY 1 3/10GY), very fine grained sand, moist, stiff	CH	5							Atterberg Limits
41		2 1			7 11	14	2.75 1.75	32.1	89.7		28	LL = 51% PL = 23% Qu = 3,243 psf
42												
43												
44												
45	3-10	T	Moist, stiff		3							
46			Boring terminated at 46½ feet. Groundwater initially encountered at 5 feet. and measured at 3 feet at end of drilling.		4 5	9						

Pacific Crest ENGINEERING INC

Log of Test Borings
Hanson Slough Boardwalks
Watsonville, California

Figure No. 12
Project No. 19141
Date: 10/5/20

LOGGED BY CLA | DATE DRILLED 8/9/20 | BORING DIAMETER 8" HS | BORING NO. 4

DRILL RIG Britton Track Mounted CME 55 | HAMMER TYPE Auto-Trip

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
			AC: 2" AB: 4"									
1				OL								
2												
3												
4			▼									
5	4-1	T	**ORGANIC LEAN CLAY, PEAT:** Black (10YR 2/1), organic rich, scattered rootlets, moist, very soft		3							
6		2			3		1.0					
		1			4	6	1.5					
7			Strong hydrogen sulfide odor, organic rich									
8												
9												
10	4-2	L	Very moist, very soft		0							
					0							Atterberg Limits LL = 614%
11					1	1		432			341	PL = 273%
12												
13												
14												
15	4-3	T	Wet, very soft		2							
		2			1		0.5	166	24.9			
16		1			1	2	1.0					
17												
18												
19												
20	4-4	L	**SANDY FAT CLAY:** Very dark gray (10YR 3/1), very fine grained sand, few rootlets scattered throughout the sample, wet, very soft	CH	0							
					0							Atterberg Limits LL = 67%
21					1	1		37.9			43	PL = 24%
22												
23												

Pacific Crest ENGINEERING INC

Log of Test Borings
Hanson Slough Boardwalks
Watsonville, California

Figure No. 13
Project No. 19141
Date: 10/5/20

LOGGED BY CLA | DATE DRILLED 8/9/20 | BORING DIAMETER 8" HS | BORING NO. 4

DRILL RIG Britton Track Mounted CME 55 | HAMMER TYPE Auto-Trip

Depth (feet)	Sample	Sample Type	Soil Description	USCS	Field Blow Counts	SPT "N" Value	Pocket Pen. (tsf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200	Plasticity Index	Additional Lab Results
24			**FAT CLAY:** Very dark greenish gray (GLEY 1 3/10GY), trace very fine grained sand, very moist, stiff	CH								
25	4-5 T				2							
26		2			2		1.5					
		1			5	7	1.5	33.2	89.6			Qu = 2,856 psf
27												
28												
29												
30	4-6 L		Mottled very dark greenish gray (GLEY 1 3/10GY) and yellowish brown (10YR 5/8), fine grained sand, approximately 2-inch thick sand lens at 31 feet, very moist, stiff		4							
31					10							
					14	13		25.0				
32												
33												
34												
35	4-7 T		Slight increase in sand content, very moist, stiff		10							
36		2			10		3.0					
		1			22	32	3.75	22.1	104.5			Qu = 3,761 psf
37												
38												
39												
40	4-8 L		Lack of mottling, silty, very moist, very stiff		5							
41		2			7		4.0					
		1			11	14	3.0	29.9	93.6			Qu = 3,862 psf
42			Boring terminated at 41½ feet. Groundwater initially encountered at 5 feet. Measured at 4 feet at the end of drilling (will likely equilibrate at 2 feet).									
43												
44												
45												
46												

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Log of Test Borings
Hanson Slough Boardwalks
Watsonville, California

Figure No. 14
Project No. 19141
Date: 10/5/20

APPENDIX C

Infiltration Test Results

SHALLOW QUICK INFILTROMETER TEST

Native Soil Assessment for Small Infiltration Based Stormwater Control Measures

Test Information							
Test No.:	P-1	*Test Date:*	5/7/2024	*Test By:*	MPR	*Job No.:*	2219
Location of Test:		West side of Lee Road barn					
Soil Information							
% Gravel	0.0	*% Sand*	29.4	*% Fines*		*70.6*	
USCS Description:		CI		*USCS Classification:*		Sandy Clay	
Test Configuration & Constants							
Existing Surface Elevation (ft.)			N/A	*Boring Depth (ft.)*			5.0
Bioswale Invert Elevation (ft.)			N/A	*Diameter of Test Boring (in.)*			6.0
Bottom of Boring Elevation (ft.)			N/A	*Cross-Section Area of Boring (in^2)*			28.3

Constant Head Infiltration Data							
Interval		*Actual Time (hr:min)*	*Interval Time (min)*	*Water Head (in)*	*Initial Fill Volume (in^3)*	*Final Fill Volume (in^3)*	*Infiltration Rate (in/hr.)*
0	*Start*	10:57 AM	30	24.00	462.00	584.72	0.51
	End	11:27 AM					

Falling Head Infiltration Data							
Interval		*Actual Time (hr:min)*	*Interval Time (min)*	*Flow Readings*		*Infiltration Volume (in^3)*	*Infiltration Rate (in/hr.)*
				Water Head (in)	*Change in Elev (in)*		
1	*Start*	11:27 AM	15	24.00	4.08	115.36	1.04
	End	11:42 AM		19.92			
	Start	11:42 AM	15	19.92	0.96	27.14	0.28
	End	11:57 AM		18.96			
	Start	11:57 AM	15	18.96	3.00	84.82	0.95
	End	12:12 PM		15.96			
	Start	12:12 PM	15	15.96	3.00	84.82	1.13
	End	12:27 PM		12.96			
2	*Start*	12:27 PM	15	12.96	1.44	40.72	0.63
	End	12:42 PM		11.52			
	Start	12:42 PM	15	11.52	1.56	44.11	0.76
	End	12:57 PM		9.96			
	Start	12:57 PM	15	9.96	1.44	40.72	0.80
	End	1:12 PM		8.52			
	Start	1:12 PM	15	8.52	1.56	44.11	1.01
	End	1:27 PM		6.96			

Test Results			
Infiltration Rate, I_t (in/hr.)*:	0.80	Factored Infiltration Rate, K_f (in/hr)**:	0.40

*I_t is taken as the average infiltration rate for Interval 2. **K_f includes a factor of safety of 2.

SHALLOW QUICK INFILTROMETER TEST

Native Soil Assessment for Small Infiltration Based Stormwater Control Measures

Test Information							
Test No.:	P-2	*Test Date:*	5/7/2024	*Test By:*	MPR & CA	*Job No.:*	2219
Location of Test:		East side of Lee Road barn					
Soil Information							
% Gravel	--	*% Sand*	--	*% Fines*		--	
USCS Description:		SP		*USCS Classification:*		Poorly Graded Sand	
Test Configuration & Constants							
Existing Surface Elevation (ft.)			N/A	*Boring Depth (ft.)*			5.0
Bioswale Invert Elevation (ft.)			N/A	*Diameter of Test Boring (in.)*			6.0
Bottom of Boring Elevation (ft.)			N/A	*Cross-Section Area of Boring (in^2)*			28.3

Constant Head Infiltration Data							
Interval		*Actual Time (hr:min)*	*Interval Time (min)*	*Water Head (in)*	*Initial Fill Volume (in^3)*	*Final Fill Volume (in^3)*	*Infiltration Rate (in/hr.)*
0	*Start*	9:55 AM	30	24.00	1039.50	6958.88	24.63
	End	10:25 AM					

Falling Head Infiltration Data							
Interval		*Actual Time (hr:min)*	*Interval Time (min)*	*Flow Readings*		*Infiltration Volume (in^3)*	*Infiltration Rate (in/hr.)*
				Water Head (in)	*Change in Elev (in)*		
1	*Start*	10:25 AM	5	24.00	24.00	678.58	32.00
	End	10:30 AM		0.00			
	Start	10:32 AM	2	24.00	24.00	678.58	80.00
	End	10:35 AM		0.00			
	Start	10:37 AM	3	24.00	24.00	678.58	53.33
	End	10:40 AM		0.00			
	Start						
	End						
2	*Start*						
	End						
	Start						
	End						
	Start						
	End						
	Start						
	End						

Test Results			
Infiltration Rate, I_t (in/hr.)*:	55.11	Factored Infiltration Rate, K_f (in/hr)**:	27.56

*I_t is taken as the average infiltration rate for Interval 2. **K_f includes a factor of safety of 2.

SHALLOW QUICK INFILTROMETER TEST

Native Soil Assessment for Small Infiltration Based Stormwater Control Measures

Test Information							
Test No.:	P-3	*Test Date:*	5/9/2024	*Test By:*	CA	*Job No.:*	2283
Location of Test:		Ridge south of Lee Road					
Soil Information							
% Gravel	1.1	*% Sand*	62.0	*% Fines*		36.9	
USCS Description:		SC		*USCS Classification:*		Clayey SAND	
Test Configuration & Constants							
Existing Surface Elevation (ft.)			N/A	*Boring Depth (ft.)*			5.0
Bioswale Invert Elevation (ft.)			N/A	*Diameter of Test Boring (in.)*			6.0
Bottom of Boring Elevation (ft.)			N/A	*Cross-Section Area of Boring (in^2)*			28.3

Constant Head Infiltration Data

Interval		*Actual Time (hr:min)*	*Interval Time (min)*	*Water Head (in)*	*Initial Fill Volume (in^3)*	*Final Fill Volume (in^3)*	*Infiltration Rate (in/hr.)*
0	*Start*	10:11 AM	30	24.00	462.00	573.89	0.47
	End	10:41 AM					

Falling Head Infiltration Data

Interval		*Actual Time (hr:min)*	*Interval Time (min)*	*Flow Readings*		*Infiltration Volume (in^3)*	*Infiltration Rate (in/hr.)*
				Water Head (in)	*Change in Elev (in)*		
1	*Start*	10:41 AM	15	24.00	5.16	145.90	1.35
	End	10:56 AM		18.84			
	Start	10:56 AM	15	18.84	2.16	61.07	0.67
	End	11:11 AM		16.68			
	Start	11:11 AM	15	16.68	1.92	54.29	0.67
	End	11:26 AM		14.76			
	Start	11:26 AM	15	14.76	1.56	44.11	0.60
	End	11:41 AM		13.20			
2	*Start*	11:41 AM	15	13.20	1.32	37.32	0.56
	End	11:56 AM		11.88			
	Start	11:56 AM	15	11.88	1.08	30.54	0.50
	End	12:11 PM		10.80			
	Start	12:11 PM	15	10.80	1.08	30.54	0.55
	End	12:26 PM		9.72			
	Start	12:26 PM	15	9.72	0.96	27.14	0.54
	End	12:41 PM		8.76			

Test Results			
Infiltration Rate, I_t (in/hr):	0.54	Factored Infiltration Rate, K_f (in/hr)**:	0.27

*I_t is taken as the average infiltration rate for Interval 2. **K_f includes a factor of safety of 2.

SHALLOW QUICK INFILTROMETER TEST

Native Soil Assessment for Small Infiltration Based Stormwater Control Measures

Test Information							
Test No.:	P-4	*Test Date:*	5/7/2024	*Test By:*	CA	*Job No.:*	2283
Location of Test:		Below Lee Road ridge					
Soil Information							
% Gravel	2.0	*% Sand*	6.8	*% Fines*		91.2	
USCS Description:		CH		*USCS Classification:*		FAT CLAY with Sand	
Test Configuration & Constants							
Existing Surface Elevation (ft.)			N/A	*Boring Depth (ft.)*			5.0
Bioswale Invert Elevation (ft.)			N/A	*Diameter of Test Boring (in.)*			6.0
Bottom of Boring Elevation (ft.)			N/A	*Cross-Section Area of Boring (in^2)*			28.3

Constant Head Infiltration Data							
Interval		*Actual Time (hr:min)*	*Interval Time (min)*	*Water Head (in)*	*Initial Fill Volume (in^3)*	*Final Fill Volume (in^3)*	*Infiltration Rate (in/hr.)*
0	*Start*	11:53 AM	30	36.00	693.00	721.88	0.08
	End	12:23 PM					

Falling Head Infiltration Data							
Interval		*Actual Time (hr:min)*	*Interval Time (min)*	*Flow Readings*		*Infiltration Volume (in^3)*	*Infiltration Rate (in/hr.)*
				Water Head (in)	*Change in Elev (in)*		
1	*Start*	12:23 PM	30	36.00	0.00	0.00	0.00
	End	12:53 PM		36.00			
	Start	12:53 PM	30	36.00	0.00	0.00	0.00
	End	1:23 PM		36.00			
	Start	1:23 PM	30	36.00	0.00	0.00	0.00
	End	1:53 PM		36.00			
	Start	1:53 PM	30	36.00	0.00	0.00	0.00
	End	2:23 PM		36.00			
2	*Start*	2:23 PM	30	36.00	0.00	0.00	0.00
	End	2:53 PM		36.00			
	Start	2:53 PM	30	36.00	0.00	0.00	0.00
	End	3:23 PM		36.00			
	Start	3:23 PM	30	36.00	0.00	0.00	0.00
	End	3:53 PM		36.00			
	Start	3:53 PM	30	36.00	0.00	0.00	0.00
	End	4:23 PM		36.00			

Test Results			
Infiltration Rate, I_t (in/hr):	0.00	Factored Infiltration Rate, K_f (in/hr)**:	0.00

*I_t is taken as the average infiltration rate for Interval 2. **K_f includes a factor of safety of 2.

SHALLOW QUICK INFILTROMETER TEST

Native Soil Assessment for Small Infiltration Based Stormwater Control Measures

Test Information							
Test No.:	P-5	*Test Date:*	5/7/2024	*Test By:*	CA	*Job No.:*	2283
Location of Test:		Below Lee Road ridge					
Soil Information							
% Gravel	0.7	*% Sand*	26.3	*% Fines*		73.0	
USCS Description:		CH		*USCS Classification:*		Sandy FAT CLAY	
Test Configuration & Constants							
Existing Surface Elevation (ft.)			N/A	*Boring Depth (ft.)*			5.0
Bioswale Invert Elevation (ft.)			N/A	*Diameter of Test Boring (in.)*			6.0
Bottom of Boring Elevation (ft.)			N/A	*Cross-Section Area of Boring (in^2)*			28.3

Constant Head Infiltration Data							
Interval		*Actual Time (hr:min)*	*Interval Time (min)*	*Water Head (in)*	*Initial Fill Volume (in^3)*	*Final Fill Volume (in^3)*	*Infiltration Rate (in/hr.)*
0	*Start*	12:33 PM	30	36.00	693.00	721.88	0.08
	End	1:03 PM					

Falling Head Infiltration Data							
Interval		*Actual Time (hr:min)*	*Interval Time (min)*	*Flow Readings*		*Infiltration Volume (in^3)*	*Infiltration Rate (in/hr.)*
				Water Head (in)	*Change in Elev (in)*		
1	*Start*	1:03 PM	30	36.00	0.00	0.00	0.00
	End	1:33 PM		36.00			
	Start	1:33 PM	30	36.00	0.00	0.00	0.00
	End	2:03 PM		36.00			
	Start	2:03 PM	30	36.00	0.00	0.00	0.00
	End	2:33 PM		36.00			
	Start	2:33 PM	30	36.00	0.00	0.00	0.00
	End	3:03 PM		36.00			
2	*Start*	3:03 PM	30	36.00	0.00	0.00	0.00
	End	3:33 PM		36.00			
	Start	3:33 PM	30	36.00	0.00	0.00	0.00
	End	4:03 PM		36.00			
	Start	4:03 PM	30	36.00	0.00	0.00	0.00
	End	4:33 PM		36.00			
	Start	4:33 PM	30	36.00	0.00	0.00	0.00
	End	5:03 PM		36.00			

Test Results			
Infiltration Rate, I_t (in/hr):	0.00	Factored Infiltration Rate, K_f (in/hr)**:	0.00

*I_t is taken as the average infiltration rate for Interval 2. **K_f includes a factor of safety of 2.

SHALLOW QUICK INFILTROMETER TEST

Native Soil Assessment for Small Infiltration Based Stormwater Control Measures

Test Information							
Test No.:	P-6	*Test Date:*	5/8/2024	*Test By:*	CA	*Job No.:*	2283
Location of Test:		Below Lee Road ridge					
Soil Information							
% Gravel	0.6	*% Sand*	42.6	*% Fines*		56.9	
USCS Description:		CH		*USCS Classification:*		Sandy FAT CLAY	
Test Configuration & Constants							
Existing Surface Elevation (ft.)			N/A	*Boring Depth (ft.)*			5.0
Bioswale Invert Elevation (ft.)			N/A	*Diameter of Test Boring (in.)*			6.0
Bottom of Boring Elevation (ft.)			N/A	*Cross-Section Area of Boring (in^2)*			28.3

Constant Head Infiltration Data							
Interval		*Actual Time (hr:min)*	*Interval Time (min)*	*Water Head (in)*	*Initial Fill Volume (in^3)*	*Final Fill Volume (in^3)*	*Infiltration Rate (in/hr.)*
0	*Start*	11:14 AM	30	24.00	462.00	462.00	0.00
	End	11:44 AM					

Falling Head Infiltration Data							
Interval		*Actual Time (hr:min)*	*Interval Time (min)*	*Flow Readings*		*Infiltration Volume (in^3)*	*Infiltration Rate (in/hr.)*
				Water Head (in)	*Change in Elev (in)*		
1	*Start*	11:44 AM	30	24.00	0.00	0.00	0.00
	End	12:14 PM		24.00			
	Start	12:14 PM	30	24.00	0.00	0.00	0.00
	End	12:44 PM		24.00			
	Start	12:44 PM	30	24.00	0.00	0.00	0.00
	End	1:14 PM		24.00			
	Start	1:14 PM	30	24.00	0.00	0.00	0.00
	End	1:44 PM		24.00			
2	*Start*	1:44 PM	30	24.00	0.00	0.00	0.00
	End	2:14 PM		24.00			
	Start	2:14 PM	30	24.00	0.00	0.00	0.00
	End	2:44 PM		24.00			
	Start	2:44 PM	30	24.00	0.00	0.00	0.00
	End	3:14 PM		24.00			
	Start	3:14 PM	30	24.00	0.00	0.00	0.00
	End	3:44 PM		24.00			

Test Results			
Infiltration Rate, I_t (in/hr):	0.00	Factored Infiltration Rate, K_f (in/hr)**:	0.00

*I_t is taken as the average infiltration rate for Interval 2. **K_f includes a factor of safety of 2.

SHALLOW QUICK INFILTROMETER TEST

Native Soil Assessment for Small Infiltration Based Stormwater Control Measures

Test Information							
Test No.:	P-7	*Test Date:*	5/8/2024	*Test By:*	CA	*Job No.:*	2283
Location of Test:		Below Lee Road ridge					
Soil Information							
% Gravel	0.0	*% Sand*	22.0	*% Fines*		78.0	
USCS Description:		CH		*USCS Classification:*		Sandy FAT CLAY	
Test Configuration & Constants							
Existing Surface Elevation (ft.)			N/A	*Boring Depth (ft.)*			5.0
Bioswale Invert Elevation (ft.)			N/A	*Diameter of Test Boring (in.)*			6.0
Bottom of Boring Elevation (ft.)			N/A	*Cross-Section Area of Boring (in^2)*			28.3

Constant Head Infiltration Data							
Interval		*Actual Time (hr:min)*	*Interval Time (min)*	*Water Head (in)*	*Initial Fill Volume (in^3)*	*Final Fill Volume (in^3)*	*Infiltration Rate (in/hr.)*
0	*Start*	9:59 AM	30	24.00	577.50	577.50	0.00
	End	10:29 AM					

Falling Head Infiltration Data							
Interval		*Actual Time (hr:min)*	*Interval Time (min)*	*Flow Readings*		*Infiltration Volume (in^3)*	*Infiltration Rate (in/hr.)*
				Water Head (in)	*Change in Elev (in)*		
1	*Start*	10:29 AM	30	24.00	0.00	0.00	0.00
	End	10:59 AM		24.00			
	Start	10:59 AM	30	24.00	0.00	0.00	0.00
	End	11:29 AM		24.00			
	Start	11:29 AM	30	24.00	0.00	0.00	0.00
	End	11:59 AM		24.00			
	Start	11:59 AM	30	24.00	0.00	0.00	0.00
	End	12:29 PM		24.00			
2	*Start*	12:29 PM	30	24.00	0.00	0.00	0.00
	End	12:59 PM		24.00			
	Start	12:59 PM	30	24.00	0.00	0.00	0.00
	End	1:29 PM		24.00			
	Start	1:29 PM	30	24.00	0.00	0.00	0.00
	End	1:59 PM		24.00			
	Start	1:59 PM	30	24.00	0.00	0.00	0.00
	End	2:29 PM		24.00			

Test Results			
Infiltration Rate, I_t (in/hr):	0.00	Factored Infiltration Rate, K_f (in/hr)**:	0.00

*I_t is taken as the average infiltration rate for Interval 2. **K_f includes a factor of safety of 2.

Attachment D

County of Santa Cruz Environmental Health Department
Review of Project

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County of Santa Cruz

Health Services Agency - Environmental Health

701 Ocean Street, Room 312, Santa Cruz, CA 95060
(831) 454-2022 TDD/TTY - Call 711 http://www.scceh.org
Landuse@santacruzcountyca.gov

May 2, 2024

Land Trust Santa Cruz County
Bryan Largay
617 Water Street
Santa Cruz, CA 95060

RE: **Sewage Disposal System Permit Application #ON 9396; System 2**
Assessor's Parcel Number 052-081-37
Address: 275 Lee Road, Watsonville, CA 95076

Dear Mr Largay:

The Onsite Wastewater Treatment System (OWTS) Permit application submitted on March 5, 2024, has been reviewed by the Santa Cruz County Environmental Health Division staff. Your written acceptance of the special operating conditions is required prior to approval of your OWTS repair permit.

The approval of an enhanced treatment OWTS system was the only option for your property due to environmental constraints. To ensure proper operation and maintenance of this enhanced technological and engineered OWTS, yearly maintenance, sampling and inspections are required. These services are provided by an Onsite System Service Provider (OSSP), certified by the system manufacturer, who will be submitting your service inspection reports and sampling results to Environmental Health. These service costs are determined by market demand. To pay the costs of County oversight, the property owner will be assessed an annual service charge on their property tax bill, as established by resolution of the Board of Supervisors, corresponding to the Fee Level of this system.

The specific characteristics of your system and the requirements for use of that system are specified in the attached **Acknowledgment of Requirements for Use of an Onsite Wastewater Treatment System with Special Operating Characteristics**. You should particularly be aware that a **Notice of an Onsite wastewater Treatment System with Enhanced Technology and Special Operating Conditions** will be recorded in the official record of Santa Cruz County. As property owner, you must sign and return the enclosed **"Acknowledgment of Requirements for Use of an Onsite Wastewater Treatment System with Special Operating Characteristics"** before the permit can be issued and work can proceed. If you have any questions, please contact me, Monday through Friday at (831) 454-2748.

Sincerely,

Heather Reynolds, REHS
Environmental Health Program Manager

Enclosures: Acknowledgment of Requirements for Use of an Onsite Wastewater Treatment System with Special Operating Characteristics

ACKNOWLEDGMENT OF REQUIREMENTS FOR USE OF ONSITE WASTEWATER TREATMENT SYSTEM WITH SPECIAL OPERATING CHARACTERISTICS

CONDITIONS OF SEWAGE DISPOSAL PERMIT NO. ON9396 **APN: 052-081-37**

OWNERS: LAND TRUST OF SANTA CRUZ COUNTY **SYSTEM NO. 2**

An application has been submitted for installation and use of an onsite sewage disposal system with special operating conditions on the subject property. As property owners, we hereby acknowledge and agree to comply with the requirements for use of this sewage disposal system, as listed below. We acknowledge that these requirements are conditions of approval of the Sewage Disposal Permit and must be complied with as long as the system installed under that Permit is in use. This Permit and the required conditions specified herein run with the land and are binding on future property owners.

System Characteristics: We acknowledge that the system proposed to serve my property is not a standard onsite sewage disposal system, as specified in County Code Sections 7.38.095 through 7.38.180. Specifically, my system falls into the category indicated below:

The system utilizes an alternative technology for improved sewage treatment and/or disposal:

- AdvanTex AX20 Mode 3 Enhanced Treatment System
- Shallow Rock Trench dispersal

This system accommodates the following site conditions:

- Fast percolating soils
- Reduced groundwater separation

Basic Requirements: We acknowledge and agree to comply with the following requirements to ensure that the system will not malfunction:

1. The County Health Officer shall record with the County Recorder's Office a Notice of Onsite Sewage Disposal System with Alternative Technology and Special Operating Conditions. This Notice will describe the system characteristics, requirements of operation and any restrictions on property use.

2. Due to the use of enhanced technology or the possibility of system malfunction, the County Health Officer administers the Onsite Service Provider Program and may conduct inspections of system performance and verify compliance with all requirements which are conditions of the Sewage Disposal Permit, as specified in this Acknowledgment.

3. The approval of an advanced treatment septic system was the only option for the upgrade of your property due to lack of expansion area restrictions. To ensure proper operation and maintenance of this advanced technological and complex septic system, yearly inspections and sampling are required. These services are provided by a service provider, certified by the system manufacturer, who will be submitting your service reports and sampling results to Environmental Health. These service and sampling costs are determined by market demand.

To pay the costs of this oversight, the property owner will be assessed an annual service charge on their property tax bill, as established by resolution of the Board of Supervisors, corresponding to the Fee Level of this system.

4. Current and future owners using alternative septic system technology will be required to replace or repair any components of their alternative septic systems not found to be functioning properly or not meeting performance standards as evidenced by substandard sampling results or maintenance inspection problems.

5. If an inspection by the Health Officer reveals that the system is not being operated in compliance with the required conditions of the Sewage Disposal Permit, as specified in this Acknowledgment, the property owners may be subject to a violation reinspection fee pursuant to Section 7.38.290 of the County Code.

6. The property owners are responsible for ensuring that any tenants or other occupants of the property comply with the required conditions of the Sewage Disposal Permit, as specified in this Acknowledgment.

7. The property owners are responsible for maintaining the sewage disposal system at all time to prevent sewage from surfacing on the ground. Required measures shall include: ensuring that all sewage pipes are connected to the disposal systems, pumping the tank out and restricting water use, and seeking a permit to upgrade the system if necessary.

8. The system shall be operated to provide the minimum effluent quality. That is to reduce total nitrogen (N) concentration in the effluent sample by 50% of the total nitrogen concentration in the influent sample or less than or equal to 30 mg-N/L (whichever is less) and BOD and TSS to less than 30 mg-/L. Further upgrades shall be made if this objective is not met.

Specific Operating Requirements

- The system shall be maintained according to the designer's and manufacturer's requirements.

- The property owner shall maintain a service contract with a qualified operator to annually inspect, monitor and maintain the system. Monitoring and maintenance reports shall be submitted to Santa Cruz County Environmental Health Service at a minimum of an annual basis.

- Samples are required annually. If testing is not satisfactory, monthly testing may be required until a passing report is submitted to Santa Cruz County Environmental Health.

ACKNOWLEDGMENT OF REQUIREMENTS FOR USE OF ONSITE WASTEWATER TREATMENT SYSTEM WITH SPECIAL OPERATING CHARACTERISTICS

CONDITIONS OF SEWAGE DISPOSAL PERMIT NO. ON9396 **APN: 052-081-37**

OWNERS: LAND TRUST OF SANTA CRUZ COUNTY **SYSTEM NO. 2**

- The Property owner shall install and maintain water conservation devices including toilets utilizing 1.6 gallons or less per flush, showerheads, which use not more than 2.5 gallons per minute and take other measures as necessary to limit daily wastewater flow to a maximum of 600 gallons per day of residential wastewater use.

Restrictions on Property Use

1. The use and occupancy of the TWO caretaker units served by this system shall be limited so that the maximum daily wastewater flow does not exceed the disposal system capacity, or no more than 600 gallons per day total, unless the onsite wastewater treatment system (OWTS) is upgraded under permit.

2. The use and occupancy of each unit served by this system shall be limited to a total number of TWO (2) bedrooms unless the OWTS is upgraded under permit.

3. No remodels will be allowed, which increase either of the units by more than 500 square feet unless the OWTS is upgraded under permit.

We acknowledge and agree to comply with the requirements for installation and use of the Onsite Sewage Disposal System on my property, as specified above, and the general provisions of County Code Chapter 7.38.

By _____ 5-23-2024

Land Trust of Santa Cruz County (Bryan Largay) Date

The initial Fee Level is set at **6**, which as of this date is $167.00 per year.

Sent by: _____ Approved by: _____ Date _____

Heather Reynolds, REHS Supervisor

Attachment E

Transportation Assessment

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DUDEK
725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

MEMORANDUM

To:	Mark Bibbo, Conservation Project Manager, Land Trust of Santa Cruz County
From:	Lisa Valdez, Senior Transportation Planner
Subject:	Watsonville Slough Farm Community Harvest Project: Transportation Assessment
Date:	July 10, 2024
cc:	Stephanie Strelow, Dudek

Dudek has prepared the following transportation assessment for the proposed Watsonville Slough Farm Community Harvest Project (Farm or Project) within unincorporated Santa Cruz County (County), California. The following analysis has been prepared consistent with the Senate Bill 743 (SB 743) Implementation Guidelines for the County of Santa Cruz (RBF 2020) and the current California Environmental Quality Act (CEQA) guidelines which requires that transportation impacts, analyzed under CEQA, be based on the vehicle miles traveled (VMT) metric. The following memorandum summarizes the proposed Project operations, describes the existing transportation setting, presents the estimated project trip generation, provides a qualitative VMT analysis, and evaluates the potential impacts to pedestrian and bicycle access and facilities.

1.0 Project Description

Watsonville Slough Farm is an existing working farm with active organic row crop production. The property is owned by the Land Trust of Santa Cruz County (Land Trust) and managed with the combined goals of preserving agricultural land, restoring coastal ecosystems, and connecting people with nature. The project site is located at 275 Lee Road in the southern part of unincorporated Santa Cruz County (see Figure 1). The site is located immediately south of Pajaro Valley High School and is approximately 0.5 miles from developed residential and commercial areas in the northern part of the City of Watsonville. The project site is bordered by Lee Road on the east, Harkins Slough Road on the north, and agricultural and rural lands on the west and south.

Existing facilities at the Farm include a barn and unimproved parking area at the Lee Road entrance, and two barns and a restroom at the southwestern corner of the site that are accessed via an existing farm road from Harkins Slough Road. A system of unpaved roads and trails traverse the property.

Figure 2 presents the overall site plan. The proposed project would result in structural and site improvements to support operation of the proposed Community Harvest Program at the Farm. The Program calls for opening up areas on the Farm to local families and other visitors so they can harvest fruits and vegetables for their own consumption while learning about healthy food and sustainable agricultural practices. A reconstructed barn, new restrooms, picnic areas, parking improvements, trails, observation platforms, and other minor improvements are proposed to support the Program. The new barn would accommodate offices and meeting rooms that would be used by the Land Trust and its partner organizations, including Watsonville Wetlands Watch, Esperanza Community Farms, and

the Amah Mutsun Land Trust. In addition, the Project includes development of four agricultural worker residential units; one unit would be a designated caretaker unit.

An approximately 5-mile trail system would be made newly accessible to the public. The new trail system consists of approximately 4.2 miles of existing farm roads and trails, and approximately 0.8 miles of new trail. Trails would be designed and managed for walking. No use by dogs, bikes, motor vehicles or horses is proposed, except to accommodate people with disabilities.

1.1 Proposed Operations

A summary of the proposed hours of operation and expected number of employees, visitors, and special events is provided below.

Hours of Operation

The Community Harvest Program would operate throughout the year. Typical daily hours when the Farm would be open to public are 9:00 a.m. to 5:00 p.m. in the winter and 8:00 a.m. to 6:30 p.m. in the summer.

Employees

Existing employees at the site include one caretaker (a Land Trust "volunteer") and one farmworker. With the project, onsite employees would increase to up to 21employees, resulting in a net increase of up to 19 onsite employees. The new office space in the reconstructed barn at the Gateway would accommodate up to 20 daily employees. However, the total maximum number of employees would only be expected to be onsite approximately 50 percent of the time. Onsite employees resulting from the project also would include four employees/residents at the four residential sites for the caretaker and farm workers.

Visitors

The Land Trust estimates approximately 50,000 annual visitors would be served by the proposed Community Harvest Program based on comparisons with the visitation at the Land's Trust's Glenwood Preserve and other visitor sites in the region. Visitation would be highest on weekends with an estimated peak day attendance of approximately 250 people per day, Saturday and Sunday, on summer weekends. The proposed Community Harvest Program is intended to fill underserved South County; and the Land Trust estimate that 80 percent of visitors would be from areas within a 10-minute drive of the site (primarily from the Watsonville and Pajaro areas) with the other 20 percent being from elsewhere around the County.

School Tours

It is expected that school tours would be provided on a regular basis in which students from all grades would be bussed to the site. Approximately 5,000 students per year are expected, which would be in addition to the estimated 50,000/year public visitors. It is expected that up to one bus per day with 30 students per bus would visit the site on approximately 165 days throughout the year.

Special Events

A number of special events are expected to be held throughout the year by the Land Trust and its partners. Special events could occur concurrently with daily Community Harvest Program visitation. There would be no weddings or renting out the facilities. Based on typical events held by the Land Trust and its partners, 19 annual events could be held with the following attendance:

- Six events per year with 50-100 attendees
- Eight events per year with 100-150 attendees
- Five events per year with up to 250 attendees

A summary of the proposed operations is presented in Table 1.

Table 1: Project Programs and Hours

Programs/ Activities	Hours	Frequency	Number of Employees/ Visitors/Students
Employees[1]			
On-site caretaker/residents	24 hours	Daily	4 employees
Land Trust	9:00 a.m. – 5:00 p.m.	Weekdays	6 employees
Watsonville Wetlands Watch	9:00 a.m. – 5:00 p.m.	Weekdays	4-6 employees
Esperanza Community Farms	9:00 a.m. – 5:00 p.m.	Weekdays	3 employees
Amah Mutsun Land Trust	9:00 a.m. – 5:00 p.m.	Weekdays	2 employees
Visitors			
Community Harvest Program	9:00 a.m. – 5:00 p.m. (winter) 8:00 a.m. – 6:30 p.m. (summer)	Daily	50,000 per year; 500 peak summer weekends (250 on Saturdays and 250 on Sundays)
Student Tours	9:00 a.m. – 3:00 p.m. (September – June)	Weekdays; 165 tours per year	30 students per tour (1 bus); 5,000 students per year
Special Events[2]			
Small	Varies	6 per year	50-100 attendees
Medium	Varies	8 per year	100-150 attendees
Large	Varies	5 per year	250 attendees

Notes:
1. Onsite employees would increase to up to a total of 20 employees, resulting in a net increase of 18 employees. Total maximum number of employees would only be expected to be onsite 50% of the time.
2. Special events may occur concurrent with Community Harvest Program

1.2 Access, Circulation, and Parking

Access to the site is currently provided from one driveway on Lee Road and one driveway on Harkins Slough Road. The primary access to the site will continue to be provided from Lee Road. The existing driveway on Harkins Slough Road, which is partially located on adjacent property, will remain, but will be used for agricultural use only. A new driveway will be constructed from Harkins Slough Road approximately 400 feet east of the existing driveway and

will extend approximately 350 feet before connecting to the existing road. Entry road improvements are proposed at both access points, including signage, fencing and driveway transitions. The existing Lee Road entrance would also be regraded.

Vehicle parking would be provided in previously hardscaped portions of the former residential area at the Lee Road entrance. Parking would be provided for 52 vehicles and 11 bicycles. The parking area would include three charging stations (with stub ups for future expansion). The northeast part of the Gateway area will be used for overflow parking during special events and as picnic area when not used for parking. For the larger events (250 attendees), the Land Trust would arrange for offsite parking and a shuttle service.

Figure 1. Project Location

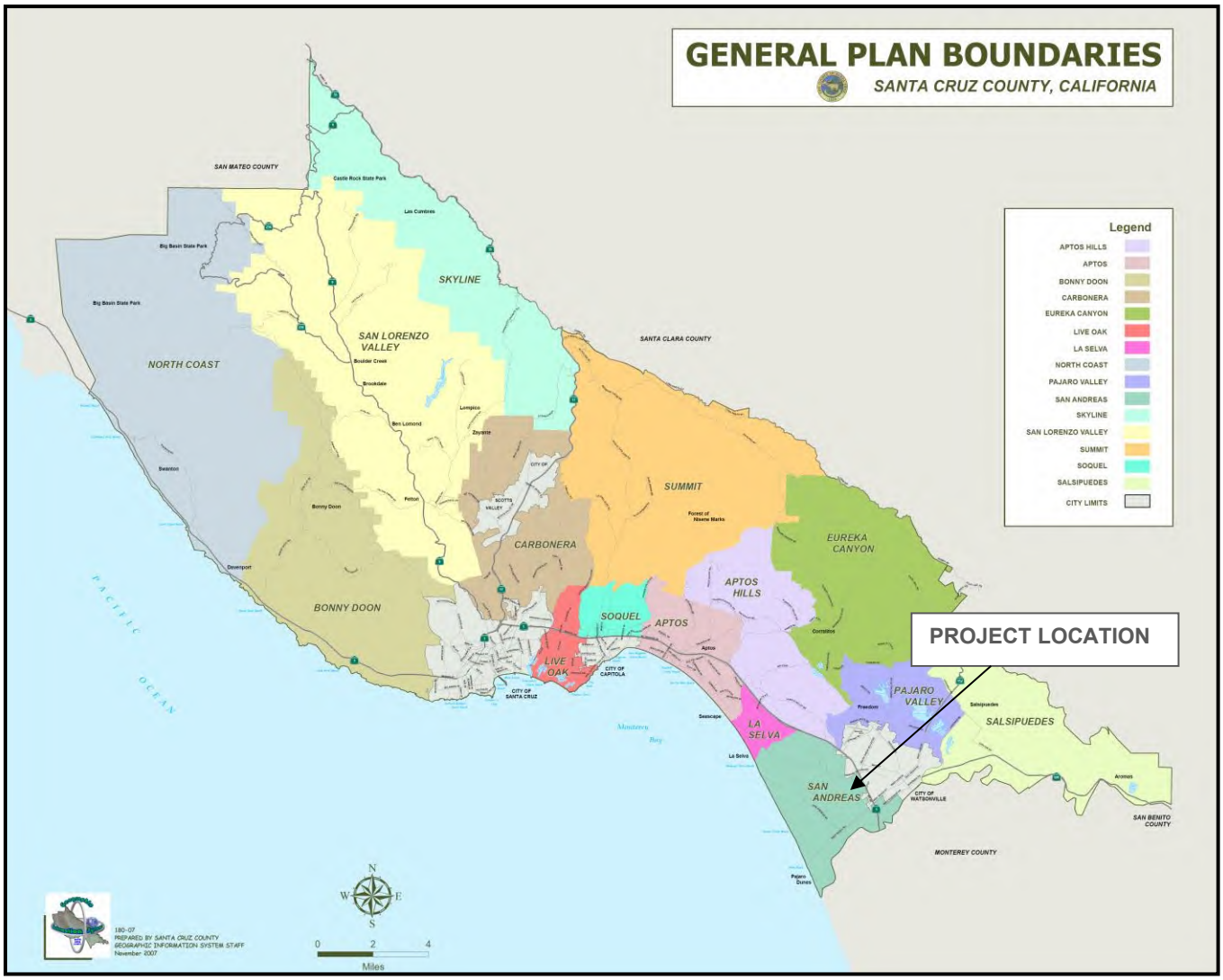
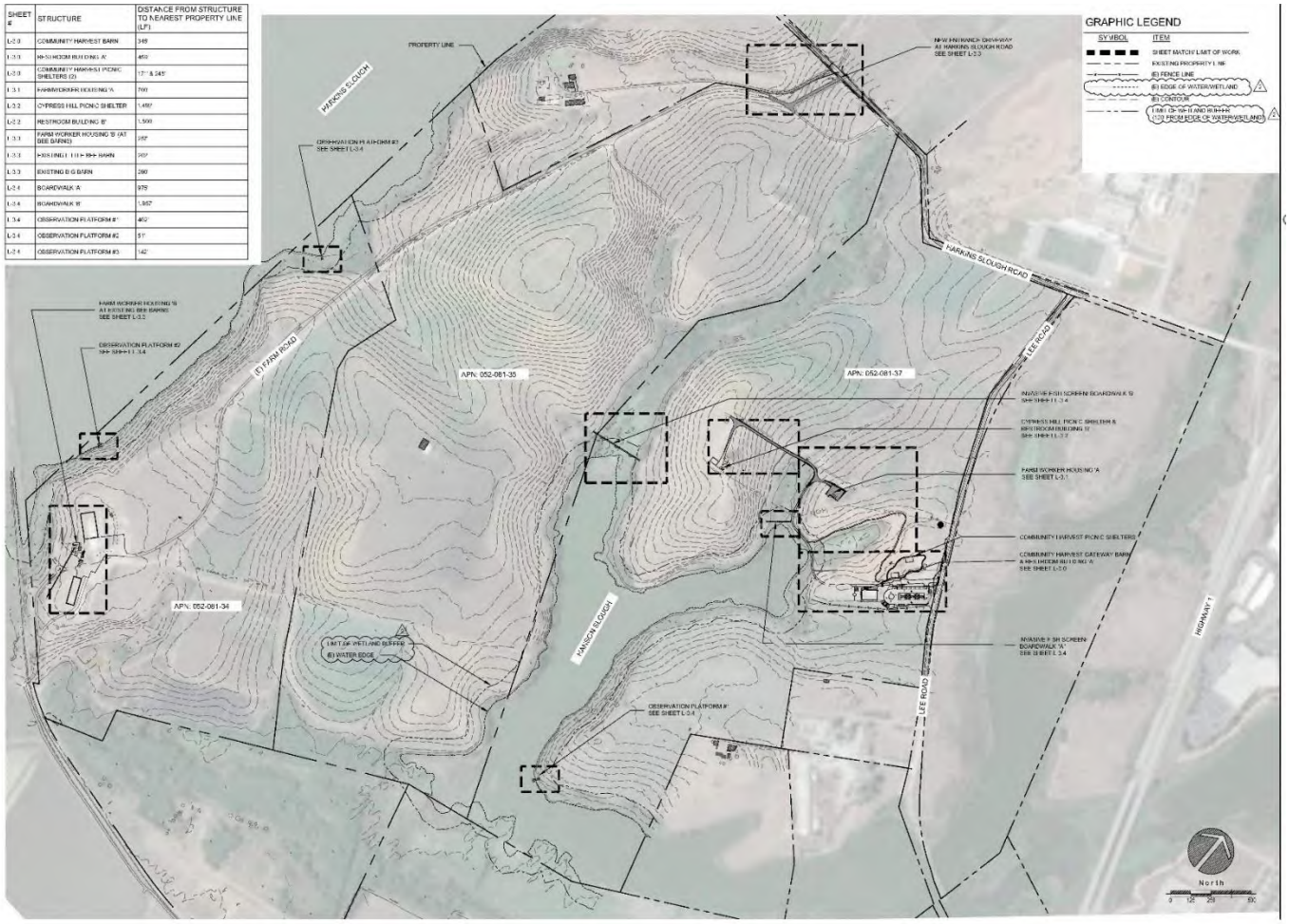


Figure 2. Project Overall Site Plan



2.0 Transportation Setting

This section provides a summary of the existing street network, including the major roadways serving the site, the existing transit service, and bicycle and pedestrian facilities in the area.

2.1 Road Network

Regional access to the Project site is provided primarily by Highway 1 and Highway 152 (Main Street) both located to the east of the Project site. The local street system serving the site includes Harkins Slough Road, Lee Road and Green Valley Road. A description of the nearby roads serving the site is provided below.

Highway 1, near the project site, is a north-south, four-lane divided highway located east of the project site. Highway 1 provides regional access to the project site and is a major connection through Watsonville and the region. A southbound on-ramp and northbound off-ramp are provided at Harkins Slough Road for vehicles traveling to and from the south on Highway 1. Access to and from Highway 1 to the north is provided via Green Valley Road and Highway 152.

Highway 152 is an east-west, generally two-lane highway that extends over 100 miles from Highway 99 in the City of Merced to the City of Watsonville. In Watsonville, Highway 152 integrates with the local roadway network and in the Downtown area becomes Main Street. Within the unincorporated county, Highway 152 follows the Santa Cruz Mountains toward the City of Gilroy, where it connects to Highway 101.

Harkins Slough Road is an east-west road located north of the site. Harkins Slough Road is a two-lane undivided road west of Highway 152 and a four-lane divided road east of Highway 152. Harkins Slough Road connects the project site to downtown Watsonville. Class II bikes lanes (on-street painted lanes) are provided on the segment of Harkins Slough Road, between Green Valley Road and Highway 129 in downtown Watsonville.

Lee Road is a north-south two-lane undivided road that provides direct access to the site. The road connects to Harkins Slough Road on the north and ends at the Struve Slough south of the project site. South of the slough, Lee Road extends south to Highway 129.

Green Valley Road, near the project site, is a north-south four-lane divided road providing access through the northern part of Watsonville. Class II bikes lanes (on-street painted lanes) are provided on Green Valley Road between Harkins Slough Road to the south and the City limits at Holohan Road to the north.

2.2 Transit System

Transit service in the project area is provided by the Santa Cruz Metropolitan Transit District (Metro)). Route 2 operates along Highway 1, near the project site. Routes 72, 72W, 74S, 75, and 78 operate along Harkins Slough Road and Green Valley Road near the project site (Metro 2024).

Route 2 provides service between Capitola, Cabrillo College, the Watsonville Square Shopping Center, and the Watsonville Transit Center. The route operates on weekdays from 5:45 a.m. to approximately 12:30 a.m. with approximately 30-minute headways, and on weekends from 7:00 a.m. to 11:40 p.m. with approximately 30-minute headways. The nearest bus stop is located near the intersection of Green Valley Road and Main Street, approximately 0.75 miles northeast of the project site.

Routes 72 and 72W provide service between the Watsonville Transit Center, the Watsonville Square Shopping Center, Amesti/Pinto Lake, and the Freedom Centre. Route 72 operates on weekdays only, from 6:30 a.m. to approximately 7:00 p.m. with approximately 60-minute headways. Route 72W operates on weekends only, from 10:00 a.m. to 6:30 p.m. with approximately two-hour headways. The 72W weekend route also serves Corralitos. The nearest bus stop is located near the intersection of Green Valley Road and Main Street, approximately 0.75 miles northeast of the project site.

Route 74S provides service between the Watsonville Transit Center, Pajaro Valley High School, the Watsonville Square Shopping Center, the Watsonville Hospital, and the Watsonville Municipal Airport. The route operates twice per weekday (one in the morning beginning at 7:30 a.m. and one in the evening beginning at 3:55 p.m.). There is no service on the weekends. The nearest bus stop to the site is provided at the Pajaro Valley High School located on the north side of Harkins Slough Road, across the street from the project site.

Route 75 provides service between the Watsonville Transit Center, the Watsonville Square Shopping Center, the Freedom Centre, and Wheelock. The route operates on weekdays from 5:00 a.m. to approximately 7:00 p.m. with approximately 60-minute headways, and on weekends from 6:00 a.m. to approximately 7:00 p.m., with 60-minute headways. The nearest bus stop is located near the intersection of Green Valley Road and Main Street, approximately 0.75 miles northeast of the project site.

Route 78 provides service between the Watsonville Transit Center, Ohlone, the Watsonville Hospital, and the Freedom Centre. The route operates on weekdays from 5:50 a.m. to approximately 6:40 p.m. with approximately 60-minute headways, and on weekends from 6:50 a.m. to approximately 6:30 p.m., with 60-minute headways. The nearest bus stop is located near the intersection of Green Valley Road and Main Street, approximately 0.75 miles northeast of the project site.

2.3 Pedestrian and Bicycle Facilities

The project site is primarily surrounded by agricultural land with limited pedestrian or bicycle infrastructure provided. Except for the sidewalk provided along the entrance road to Pajaro Valley High School, there are no sidewalks within the immediate vicinity of the site. The nearest bicycle facility is a Class II bike lane located on Harkins Slough Road, south of Green Valley Road.

The City of Watsonville Trails and Bicycle Master Plan (RBF 2012) proposes several trails near the project site, including a Greenway trail (multi-use path of decomposed granite) on the east side of Pajaro Valley High School starting at Airport Boulevard and ending at Harkins Slough Road. A short loop Nature path (pedestrian only, natural surface) is also proposed west of the high school providing access for Pajaro Valley High School students for use as a nature/interpretive teaching associated with the Fitz Wetlands Educational Resource Center.

The Watsonville Lee Road Trail, proposed by the City of Watsonville, is a 1.4-mile-long, 12-foot-wide pedestrian/bicycle trail connecting Pajaro Valley High School to other existing trails. The first phase, which is expected to start construction in 2025, would extend from Pajaro Valley High School along Harkins Slough Road west of Lee Road on the north and along the east side of Lee Road from the intersection with Harkins Slough Road to the entrance of the Watsonville Slough Farm. Future phases of the trail that would extend south along Lee Road from the Watsonville Slough Farm entrance to the farm and include a bridge over Struve Slough, have not yet been funded.

The Monterey Bay Sanctuary Scenic Trail Network (Trail Network) is a 50-mile bicycle and pedestrian pathway along the coast of Santa Cruz County, from the San Mateo County line in the north to the Monterey County line at Pajaro that is being implemented by the Santa Cruz County Regional Transportation Commission (SCCRTC). The Trail Network merges plans for a bicycle/pedestrian trail along the rail line that is owned by the SCCRTC into a connected network. The Trail Networks system's "spine" will be the Coastal Rail Trail, a bicycle and pedestrian trail within the 32-mile Santa Cruz Branch Rail right-of-way (ROW), adjacent to the train tracks. The Coastal Rail Trail will serve transportation, recreation and interpretive uses for walkers, joggers, bicyclists, people with mobility impairments, and families. Implementation of a number of segments within northern Santa Cruz County is underway. In the Project vicinity, the rail ROW is located west of the Project site.

3.0 Vehicle Miles Traveled

On September 27, 2013, Governor Brown signed SB 743, with the purpose of streamlining the CEQA review process for several categories. A key element of SB 743, is the elimination of automobile delay and level of service (LOS) as the sole basis of determining CEQA transportation impacts. As a result, the CEQA Guidelines recommend VMT as the most appropriate measure of project transportation impacts. In accordance with SB 743, the County has adopted guidelines, screening criteria, impact thresholds, and mitigation requirements for evaluating VMT.

3.1 Santa Cruz County VMT Screening Criteria

The County's Guidelines (Santa Cruz County 2020), provide details on appropriate screening criteria that can be used to identify when a proposed land use project is anticipated to result in a less-than-significant impact on VMT without conducting a more detailed analysis. The screening criteria are based on the California Governor's Office of Planning and Research (OPR's) Technical Advisory (OPR 2018) and are presented in Table 2. A land use project need only to meet one of the below screening thresholds to have a presumption of less-than significance.

Table 2: Santa Cruz County Screening Criteria

Project Type	Expected to cause a less-than-significant impact:	CEQA transportation analysis required if:
Small Projects	• Project trip generation is less than 110 net new trips per day.	• Project is inconsistent with the Sustainable Communities Strategy as determined by Santa Cruz County.
Project Near High Quality Transits	• Project is located within a ½ mile of an existing major transit stop as defined in California Public Resources Code § 21064.3: two or more bus lines which maintain a service interval frequency of 15 minutes or less during both the morning and afternoon peak commute periods. Currently there are no existing major transit stops in the unincorporated County.	• Project has a Floor Area Ratio (FAR) of less than 0.75. • Project includes more parking for use by residents, customers, or employees of the project than required by Santa Cruz County Code. • Project is inconsistent with the Sustainable Communities Strategy as determined by Santa Cruz County. • Replaces affordable residential units with a smaller number of moderate- or high-income residential units.
Local Serving Retail:	• No single store on-site exceeds 50,000 square feet. • Project is local-serving as determined by Santa Cruz County.	• If the nature of the service is regionally focused as determined by Santa Cruz County.
Affordable Housing	• The project provides a high percentage of affordable housing as determined by Santa Cruz County (contact County Planning Department for more information).	• The percentage of affordable housing is determined by Santa Cruz County to not be high.

Table 2: Santa Cruz County Screening Criteria

Project Type	Expected to cause a less-than-significant impact:	CEQA transportation analysis required if:
Local Essential Service	• Day care center; Public K-12 school; Police or fire facility; Local serving medical/dental office building; or Government office (in-person services such as post office, library, and utilities).	• The nature of the service is regionally focused as determined by Santa Cruz County.
Map-Based Screening	• Area of development is under threshold as shown on screening map as allowed by Santa Cruz County.	• The project will result in significant population or employment growth that substantially changes regional travel patterns as determined by Santa Cruz County.
Redevelopment Projects	• Project replaces an existing VMT-generating land use and does not result in a net overall increase in VMT.	• Project replaces an existing VMT-generating land use and results in a net overall increase in VMT.

Source: SB 743 Implementation Guidelines for the County of Santa Cruz (October 2020)

As presented above, projects can be exempt from requiring a detailed VMT analysis based on criteria related to a project's trip generation, transit-priority areas, locally serving retail or local essential services, affordable housing, map-based screening, and/or redevelopment projects.

3.2 VMT Analysis

The project is a unique land use that does not fit within a specific land use category as it contains a mix of uses (e.g., residential, office, and agriculturally-related public use). Therefore, a qualitative analysis of the project's day to day operations was conducted. Per the County's Guidelines, if there are multiple distinct land uses within the project (residential, office, retail, etc.), they are required to be analyzed separately unless they are determined to be insignificant to the total VMT. Therefore, the qualitative analysis examines each component of the project and their potential effect on VMT.

Project Trip Generation

The County's Guidelines state that projects that generate less than 110 net new trips per day can be screened from conducting a VMT analysis. Based on the proposed site operations, including the number of employees, visitors, and special events, the project trip generation was estimated for annualized average day. Trip generation was considered under annualized average conditions for the Project VMT analysis as it provides the best estimate of Project traffic over a long-term annual basis (e.g., not a temporary or seasonal condition). The project trips by land use category are presented in Table 3.

Table 3. Annual Average Project Daily Trips

Land Use	Trip Generator	Annual Average Residents/ Employees/ Visitors per day	Average Vehicle Occupancy (AVO)	Average Annual Vehicles per Day	Annual Average Trips per Day[1]
Residential	Residents[2]	4	n/a	n/a	n/a
Office	Employees[3]	9	1	9	18
Public Use	Visitors[4]	137	2.5	55	110
	Special Events[5]				
	100 guests	1.6	2.5	0.7	1
	150 guests	3.3	2.5	1.3	3
	250 guests	3.4	2.5	1.4	3

Notes:
1. Assumes one incoming and one outgoing trip per vehicle.
2. The on-site care taker and farmworkers will live and work on-site and therefore are not included in the trip generation.
3. Onsite employees would increase to up to a total of up to 21 employees, resulting in a net increase of up to 19 employees. Total maximum number of employees would only be expected to be onsite 50% of the time. Assumes an average of nine employees on-site per day.
4. Approximately 50,000 annual visitors would be served by the Community Harvest Program, equal to 137 visitors per day on average. Visitation would be highest on weekends, with a peak day attendance of approximately 250 people on summer weekends.
5. There would be six events per year with 50-100 attendees, eight events per year with 100-150 attendees, and five events per year with up to 250 attendees.

As presented in Table 3, each individual land use would generate 110 or fewer daily trips on an annualized average basis. Therefore, each component of the project would meet the daily trip screening criterion for “small projects”.

The residential component of the project includes four residential sites for the caretaker and farm workers who would live and work on-site. It is assumed that the employee trips are already occurring within the County. The project is providing consolidated office space for the Land Trust and its existing partners, including Watsonville Wetlands Watch, Esperanza Community Farms, and the Amah Mutsun Land Trust. The Watsonville Wetlands Watch currently operates at the Pajaro Valley High School adjacent to the site and Esperanza Community Farms currently farms on a portion of the Project site.

The visitors to the Community Harvest Project would generate the majority of the project trips. However, the trip generation estimate is conservative as it assumes up to 50,000 visitors per year with an average vehicle occupancy of 2.5 occupants per vehicle. The number of annual visitors and the vehicle occupancy could be higher given that the Community Harvest Program is primarily intended to serve families who may have a higher number of vehicle occupants (i.e., higher number of visitors per vehicle).

Finally, up to 19 special events are expected to be held throughout the year, with attendance ranging from 50 to up to 250 guests. As presented in Table 3, the average annual trip generation associated with the special events would be seven trips. For the larger events (250 attendees), the Land Trust would arrange for offsite parking and a shuttle service.

Local Serving Use

Per the County's guidelines, if a project is a local serving retail use of 50,000 square feet or less and is considered by the County to be local serving, the project is screened from conducting a VMT analysis. This is based on the Technical Advisory that advises that because local serving retail uses tend to improve retail destination proximity, shorten trips, and reduce VMT, they may be presumed to have less than significant impacts. Per the Technical Advisory and County VMT Guidelines, this criterion also includes projects that are local-serving as determined by Santa Cruz County.

Although not a retail use, the proposed Community Harvest Program is intended to primarily serve local residents and fill underserved South County. The Land Trust estimates that 80 percent of visitors would be from areas within a 10-minute drive of the site. Based on a review of Google Earth, under typical traffic conditions near the project site, a vehicle could travel approximately 5 to 7 miles in 10 minutes, which would generally reach portions of Watsonville to the east and Freedom Boulevard to the north. The project is not regional in nature in that the visitors to the site would be from these local communities/areas immediately surrounding the site. The Community Harvest Program would serve the existing communities and divert some of the shopping trips from existing grocery stores or farmer markers to the project. The remaining 20 percent of visitors are assumed to be from adjoining areas in northern Monterey County (off Salinas Road) and from the communities of Pajaro and Las Lomas and still within the local area.

Furthermore, the existing barn would be demolished and rebuilt as an approximately 9,500 square foot multi-purpose barn. The new barn would accommodate offices and two small meeting rooms that would be used by the Land Trust and its partner organizations, all of which already exist in the County. The physical structures would not exceed a total of 50,000 square feet and would meet the County's screening criteria for the size of a local serving use.

Based on the analysis of the project components, the project meets the County's small project screening criterium and is also considered a local serving use. For these reasons, impacts to VMT are presumed to be less than significant.

4.0 Pedestrian and Bicycle Access

There is limited pedestrian or bicycle infrastructure provided near the site. Except for the sidewalk provided along the entrance road to Pajaro Valley High School, there are no sidewalks within the immediate vicinity of the site. The nearest bicycle facilities are Class II bike lanes located on Harkins Slough Road and Green Valley Road approximately 0.75 miles northeast of the site. Operation of the project would not interfere with these facilities and bicyclist and pedestrian safety would be maintained at existing levels in the area.

Several trails are proposed near the project site as part of the City of Watsonville Trails and Bicycle Master Plan. The Project would not include any other site improvements that would extend into the public right-of-way or alter the existing roadway network. Therefore, the Project would also not interfere with City's ability to construct any planned bicycle or pedestrian facilities in the future. There would be no impacts to these facilities.

5.0 Summary

The key findings of the transportation analysis in this memo are summarized below:

- The proposed project would result in structural and site improvements to support operation of the proposed Community Harvest Program. The Program calls for opening up areas on the Farm to local families and other visitors so they can harvest fruits and vegetables while learning about healthy food and sustainable agricultural practices. A reconstructed barn, new restrooms, picnic areas, parking improvements, trails, observation platforms, and other minor improvements are proposed to support the Program. The new barn would accommodate offices and meeting rooms that would be used by the Land Trust and its partner organizations. In addition, the Project includes development of four agricultural worker residential units; one unit would be a designated caretaker unit.
- The Project area has limited pedestrian, bicycle, or transit facilities. There would be no impact to these type of facilities.
- Based on a review of the proposed site operations, the project meets the County's small project screening criterium for VMT impacts and is also considered a local serving use. Therefore, the project would not conflict or be inconsistent with CEQA Guidelines Section 15064.3(b), and VMT impacts would be less than significant.

6.0 References

California Governor's Office of Planning and Research (OPR). 2018. Technical Advisory on Evaluating Transportation Impacts in CEQA. December.

County of Santa Cruz. 2022. Environmental Impact Report County of Santa Cruz Sustainability Policy and Regulatory Update. April 2022 (Draft EIR volume) and August 2022 (Final EIR volume). Prepared by County of Santa Cruz Community Development & Infrastructure Department with assistance by Dudek.

County of Santa Cruz. 2020. Initial Study/Environmental Checklist, Watsonville Lee Road Trail. December. Prepared by Harris Associates.

RBF Consulting. 2012. City of Watsonville Trails and Bicycle Master Plan for the Watsonville Scenic Trails Network. November.

Santa Cruz County Planning Department. 2020. SB 743 Implementation Guidelines for the County of Santa Cruz. October.

Santa Cruz Metro. 2024. Santa Cruz METRO - Home (scmtd.com)