Bat Acoustics and Habitat Assessment Report

for the

Heber 1 Parasitic Solar Project

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Introduction

Endemic Environmental Services, Inc. (EES) prepared this environmental technical report in support of California Environmental Quality Act (CEQA) compliance for the Heber 1 Solar Project (Project), on behalf of Catalyst Environmental Solutions Corporation. This report presents the findings of a habitat assessment and bat acoustic survey conducted to evaluate the potential presence of bat species and their habitat within the proposed project footprint and a surrounding buffer zone.

The biological assessment was conducted in accordance with applicable federal and state laws, including the Federal Endangered Species Act (ESA), the California Endangered Species Act (CESA), and relevant CEQA and NEPA guidance. The primary objectives were to identify suitable roosting, foraging, and breeding habitats for bats, document bat species occurrence using acoustic monitoring, and evaluate potential project impacts on bat populations, particularly sensitive species.

1. Project Description

The Heber 1 Solar Project is a proposed 20-megawatt (MW) photovoltaic energy facility located at 602 Dogwood Road, Heber, California, within Imperial County. The project area encompasses approximately 160 acres of actively managed agricultural land, primarily used for alfalfa cultivation, and is situated roughly 6 miles southeast of El Centro and 4.5 miles northwest of Calexico. The project site lies within the Imperial Valley, a region characterized by flat topography and an extensive network of irrigated agricultural fields. The surrounding landscape includes agricultural operations, residential areas, geothermal plants, and transmission infrastructure. Habitat conditions on-site are predominantly anthropogenic, with heavy water management infrastructure (e.g., irrigation ditches and canals), limited woody vegetation, and fragmented natural features. Vegetation within the site is dominated by alfalfa (*Medicago sativa*), mustards (*Brassica spp*.), and Russian thistle (*Salsola tragus*). Adjacent linear water conveyance structures provide a source of open water and limited emergent vegetation. These features are of moderate to high value to foraging insectivorous bat species.

2. Background on Bats in the Heber region

Bat populations across the United States have been declining due to multiple stressors including habitat loss, pesticide exposure, disease such as white-nose syndrome, and disturbance of roosting areas. Several bat species that may occur in California's Imperial Valley, including the Heber area, are recognized as Species of Special Concern (SSC). In California, bats are protected under the California Fish and Game Code and California Code of Regulations. Specifically, CFGC Sections 2126 and 4150 prohibit incidental or deliberate take of bats, and CCR Section 251.1 restricts methods that could result in unlawful take of bat species.

Though roosting habitat is limited in agricultural regions like Heber, bats can still make use of marginal features for shelter and rest. Bridges and culverts can serve as important roosting habitat, particularly where small crevices, hinge joints, or cavernous areas in concrete or steel structures provide dry, dark, and thermally stable conditions suitable for maternity or day roosts. Night roosts, typically located on exposed areas of structures, allow bats to rest and digest between foraging bouts and may be located either at or away from day roosts.

Irrigation canals and water bodies throughout Imperial County offer important resources to bats by providing access to drinking water and attracting insects, which are a primary food source. While natural roost sites such as rock outcrops or large trees are uncommon in this landscape, human-made features, including irrigation infrastructure, abandoned outbuildings, and utility poles, may offer occasional roosting opportunities.

In agricultural fields, bat activity is influenced by the availability of insect prey, which tends to concentrate near irrigated areas or crops. Water sources in canals or drainage ditches further enhance foraging potential, as do edge habitats along roads, field margins, or infrastructure corridors. However, intensive pesticide use, low structural diversity, and artificial lighting can diminish foraging efficiency and reduce insect abundance, ultimately limiting the suitability of these habitats for sustained bat activity.

3. Methodology

To evaluate the suitability of bat habitat and detect the presence or activity of bat species within the Heber 1 Project site, Endemic Environmental Services, Inc. conducted a two-part assessment consisting of: (1) a daytime habitat evaluation for roosting suitability, and (2) a passive nighttime acoustic survey using ultrasonic detectors. Survey methods followed guidance provided by the U.S. Fish and Wildlife Service (USFWS), Bat Conservation International (BCI), and Western Bat Working Group protocols, adapted for the Imperial Valley's agricultural setting.

3.1 Habitat Assessment

A qualified wildlife biologist conducted a systematic ground survey across the Project area and an adjacent 200-foot buffer on July 8, 2025. The survey took place under favorable weather conditions and was focused on identifying:

- Existing or potential day roost structures, such as bridges, culverts, buildings, large trees with exfoliating bark or cavities, and cliff features.
- Night roosting features, including exposed ledges, walls, or shaded alcoves on anthropogenic structures.
- Proximity to water sources, such as irrigation canals, drainages, or ponds, which influence foraging activity and insect availability.
- Vegetation structure, land use, and edge habitats that could provide aerial foraging opportunities.

All observed features were documented using GPS and photographs, and notes were taken on the surrounding land use matrix, disturbance regime, and habitat connectivity.

3.2 Acoustic Survey

3.2.1 Detector Deployment

To detect echolocation calls of active bats, two passive acoustic detectors were deployed on-site for fifteen consecutive nights, from July 8 to July 23, 2025. The detectors used were:

- Anabat Express (Titley Scientific): A full-spectrum, weatherproof acoustic detector. This unit was deployed along an unlined irrigation canal on the western edge of the Project site. The detector was oriented toward a break in the alfalfa fields with low ambient noise to optimize bat call capture.

Detectors were mounted 1.5 to 2 meters above ground level on existing structures and positioned to face open flyways and uncluttered airspace to maximize the capture range. Units were programmed to record from 30 minutes before sunset to 30 minutes after sunrise each night.

3.2.2 Recording Conditions and Quality Control

Weather conditions during the deployment period were suitable for acoustic monitoring, with overnight temperatures ranging from 75–88°F, wind speeds below 10 mph, and no precipitation. The placement and function of each detector were inspected daily. Memory cards and batteries were replaced or maintained as needed to ensure continuous, high-quality recording throughout the survey period.

3.2.3 Call Analysis

Echolocation call files were downloaded and analyzed using SonoBat 30 (Western U.S. call libraries). Bat Biologist manually vetted and screened files for quality, removed non-bat noises, and compared calls to reference libraries for species-level or species-group classification. When call quality or characteristics prevented confident species-level identification, calls were conservatively assigned to a genus or guild level (e.g., *Myotis* spp., *Lasiurus* spp.).

4. Results and Discussion

4.1 Habitat Assessment Results

The habitat assessment was conducted on July 8, 2025, under clear, warm conditions. Table 1 summarizes the field conditions and the survey team.

Table 1. Conditions during the habitat assessment on July 8, 2025.

Date: July 8th	Time	Surveyors	Temperature	Conditions
Habitat Assessment for Bats	1510	Luma Fowler Sarah Heffelfinger Nicole Hernandez	108℉	Sunny conditions

The survey team conducted a thorough pedestrian transect of the entire project area and surrounding 200-foot buffer. No direct evidence of roosting bats or suitable roost structures was observed. There were no large trees with exfoliating bark, snags, buildings, culverts, or other anthropogenic structures present on the site that could support day or maternity roosts. Similarly, no evidence of guano staining, staining near crevices, or audible bat activity was observed during the daytime assessment.

Despite the lack of roosting structures, the surrounding agricultural landscape offers moderate to high-quality foraging habitat for insectivorous bat species. The Project site, currently in alfalfa cultivation, supports a relatively open flyway with periodic insect activity associated with irrigation events. Adjacent artificial wetlands formed by agricultural runoff and canal drainage increase insect abundance, which enhances foraging potential.

Of particular note, the Central Main Canal lies approximately 2,000 feet north of the Project's northern boundary. This major irrigation waterway is lined with riparian vegetation and exhibits structural complexity and microhabitats favorable for insect proliferation. Its presence, coupled with nearby managed fields, makes it a likely bat foraging corridor and potentially influences bat activity within the southern extent of its influence zone.

4.2 Acoustic Survey Results

The passive acoustic survey conducted from July 8 to July 13, 2025, using two Anabat Express passive detectors, documented substantial bat activity across the Project boundaries. A total of 5,644 bat call files were recorded, confirming both presence and active foraging behavior throughout the survey period.

Spatial Activity Patterns
The central and eastern portions of the site, especially near irrigated field segments and utility corridors, exhibited the highest concentration of detections. These locations likely provide favorable foraging conditions due to greater insect abundance, supported by irrigation and open flight corridors.

Temporal Activity Patterns
Bat passes were consistently recorded from 30 minutes after sunset until 5:00 AM, with a notable decline in detections afterward. Both detectors showed peak activity in the first three hours after sunset, a pattern common for many aerial insectivorous bats. Activity spikes on warmer nights and following irrigation events indicate a strong relationship between water availability, insect emergence, and bat foraging intensity.Detector-specific results are summarized in **Table 1** below.

Species Composition
Species-level identification revealed use of the project area by multiple taxa with varied ecological niches:

- **Big brown bat (*Eptesicus fuscus*)** – Detected primarily by Detector 1, often producing feeding buzzes indicative of active prey capture in open and semi-open habitats.
- **Mexican free-tailed bat (*Tadarida brasiliensis*)** – The most frequently detected species at both detectors, known for long-distance foraging flights and use of open-air space over agricultural fields.
- **Canyon bat (*Parastrellus hesperus*)** – Restricted to Detector 1, typically associated with edge habitats and smaller foraging territories.
- **Pocketed free-tailed bat (*Nyctinomops femorosaccus*)** – *CDFW Species of Special Concern*; detected at both stations, suggesting commuting and foraging use of the site's airspace.

- **Western yellow bat (*Lasiurus xanthinus*)** – *CDFW Species of Special Concern*; recorded by both detectors, possibly linked to riparian vegetation or scattered trees that may serve as roosting or staging sites.

Table 1. Passive Acoustic Survey Summary (July 8–13, 2025)

Detector ID	**Total Bat Files Recorded**	**Average First Call Time (hh:mm after sunset)**	**Species Identified**	**Notable Activity Patterns**
Detector 1 (Express 3)	3,145	0:35	Big brown bat (*Eptesicus fuscus*), Mexican free-tailed bat (*Tadarida brasiliensis*), Canyon bat (*Parastrellus hesperus*), Pocketed Free-tailed Bat (*Nyctinomops femorosaccus*), Western Yellow Bat (*Lasiurus xanthinus*)	Peak activity in the first 3 hours after sunset; frequently detected feeding buzzes specially among Tabr calls.
Detector 2 (Express 2)	2,499	0:31	Mexican free-tailed bat (Tadarida brasiliensis), Pocketed Free-tailed Bat (*Nyctinomops femorosaccus*), Western Yellow Bat (*Lasiurus xanthinus*)	Peak activity in the first 3 hours after sunset;

4.3 Ecological Interpretation

The acoustic dataset confirms that while no roosting habitat exists within the Project footprint, the site is an important foraging and commuting corridor for multiple bat species, including two CDFW Species of Special Concern (*Nyctinomops femorosaccus* and *Lasiurus xanthinus*). Activity is likely sustained by irrigation-driven insect abundance, particularly following watering events, as well as by proximity to the Central Main Canal and other water sources that support insect life cycles. Agricultural land uses in the area also contribute by providing consistent prey resources throughout the summer season. Given the absence of day or night roosts within the project boundaries, no SSC-specific regulatory triggers are anticipated at this time. However, the presence of these species emphasizes the ecological value of the site as seasonal foraging habitat and reinforces the importance of minimizing disturbance to irrigated and canal-adjacent areas that support prey availability

The foraging presence of *Tadarida brasiliensis*, *Nyctinomops femorosaccus*, and *Lasiurus xanthinus* suggests that the area is part of a broader regional movement network, potentially linking roosting sites outside the project footprint to high-quality feeding grounds within the agricultural matrix. Potential vulnerabilities include changes to prey availability, water quality, and vegetative structure during project construction and operation. Mitigation measures should therefore focus on maintaining insect prey bases (e.g., minimizing pesticide drift, protecting adjacent riparian vegetation) and ensuring continued hydrological connectivity to nearby water sources.

5. ***Potential Impacts***

The construction and long-term operation of the Heber 1 Solar Project are not expected to result in the direct loss of bat roosting habitat, as the biological surveys did not identify any suitable natural or artificial roost structures within the project site. However, the project area is situated in an active agricultural landscape that supports seasonal bat foraging, particularly in areas influenced by irrigation and proximity to the Central Main Canal. As such, the primary concerns associated with the project relate to indirect impacts on foraging behavior and resource availability.

During construction, increased human activity, machinery operation, and the use of temporary lighting may create disturbances that could cause displacement of bats from foraging areas within or adjacent to the project footprint. Bats are generally sensitive to sudden changes in ambient light, sound levels, and landscape obstruction. Nocturnal construction activities, especially those occurring near the canal or irrigated field edges, may interfere with established foraging routes or reduce the quality of available habitat.

A secondary concern is the potential reduction in insect prey availability. The agricultural fields surrounding the project site are regularly treated with pesticides and herbicides. Depending on the intensity and frequency of chemical application during and after project development, the abundance and diversity of flying insects may decline, which could have a cascading effect on bat foraging efficiency and energetics. Prolonged or increased exposure to pesticides can also have sublethal effects on bats through bioaccumulation.

There is also a low potential for collision with solar infrastructure, although this risk is considered minimal for bats compared to avian species. Most insectivorous bats rely heavily on echolocation to navigate, and solar panel arrays present relatively static, low-profile obstacles. However, some studies suggest that bats may occasionally investigate reflective surfaces or mistakenly approach large open structures when foraging. This risk remains theoretical at the site level and is not expected to result in measurable mortality under typical operating conditions.

Overall, the impacts to bats from this project are likely to be indirect, short-term, and spatially limited, especially if appropriate mitigation measures are implemented.

6. Mitigation and Recommendations

The mitigation strategies recommended below are intended to reduce indirect effects on all bat species documented during the survey, including the two CDFW Species of Special Concern. Because no roosts were detected within the project boundaries, no species-specific construction restrictions or CDFW coordination are required at this stage. Nevertheless, incorporating measures that maintain prey abundance, habitat quality, and foraging corridor integrity will benefit both common and special-status bats. To reduce the potential for adverse effects on bat populations and to maintain compliance with CEQA, the Endangered Species Act, and California environmental regulations, the following mitigation strategies and best management practices are recommended:

1. **Construction Timing** – Avoid nighttime work, particularly during peak bat activity (spring and summer months). Minimize or avoid nighttime construction near irrigation canals, drainages, or vegetated edges.
2. **Lighting Management** – Implement dark-sky compliant lighting with shielding and motion activation to minimize artificial light spill into habitat areas.
3. **Pesticide and Herbicide Management** – Use integrated pest management (IPM) strategies to minimize chemical applications, particularly in areas adjacent to canal features or irrigated vegetation.
4. **Habitat Enhancement** – Work with agricultural partners to maintain or enhance vegetated margins along canals and ditches to promote insect biodiversity and foraging habitat quality.
5. **Unexpected Roost Discovery Protocol** – If potential roost features (e.g., hollow trees, crevices, culverts) are discovered during construction, temporarily halt work in the immediate area and have a qualified biologist assess for bat use before resuming.

The project developer should work with agricultural partners and landowners to enhance or preserve vegetated margins along canals and ditches. Maintaining native or mixed vegetation along these corridors can promote insect biodiversity and provide important foraging habitat. If, during grading or construction, any previously undetected structures are revealed that could provide potential bat roosting habitat (such as hollow trees, crevices, or culvert-like features), work in those areas should be temporarily halted. A qualified biologist should assess the feature for bat use, and additional surveys may be necessary before the site is cleared for continued disturbance. Implementation of these measures will reduce the likelihood of negative outcomes and ensure that the project operates in an environmentally responsible manner.

By following these measures, the project can proceed in a manner that minimizes indirect effects on both common and special-status bat species. If future surveys or monitoring reveal roosting by *Nyctinomops femorosaccus* or *Lasiurus xanthinus* within or near the project site, consultation with CDFW would be warranted at that time to discuss potential additional avoidance or minimization measures.

7. Conclusion

The Heber 1 Solar Project, as currently designed, is unlikely to result in direct impacts to roosting bat populations due to the absence of appropriate roosting structures within the project boundary. However, the site supports moderate levels of foraging activity, particularly in proximity to irrigated fields and water conveyance structures like the Central Main Canal. These features contribute to the ecological value of the area for insectivorous bats and serve as key foraging and commuting habitats.

By adopting reasonable avoidance and minimization measures such as limiting nighttime work, managing lighting design, and preserving edge habitat features, the project can proceed with minimal impact to local bat species. It is recommended that the project proponent remain in contact with the California Department of Fish and Wildlife and the U.S. Fish and Wildlife Service should any changes in project scope or newly discovered habitat features emerge during implementation. Continued agency coordination will help ensure regulatory compliance and protection of sensitive wildlife resources.

Please feel free to contact me if you have any questions or need additional information.

Sincerely,

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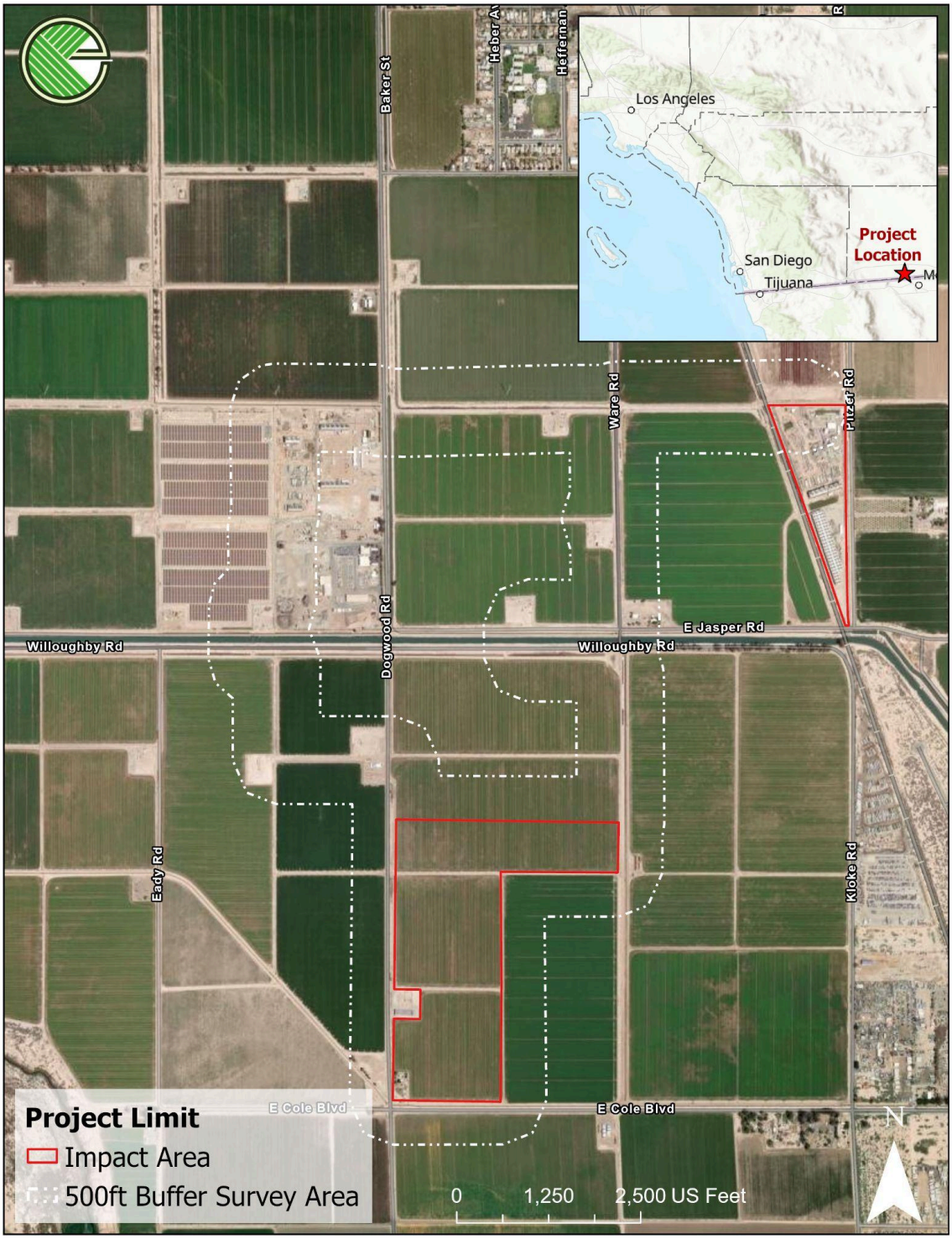
APPENDIX

Photo 1. An overview of the habitat.

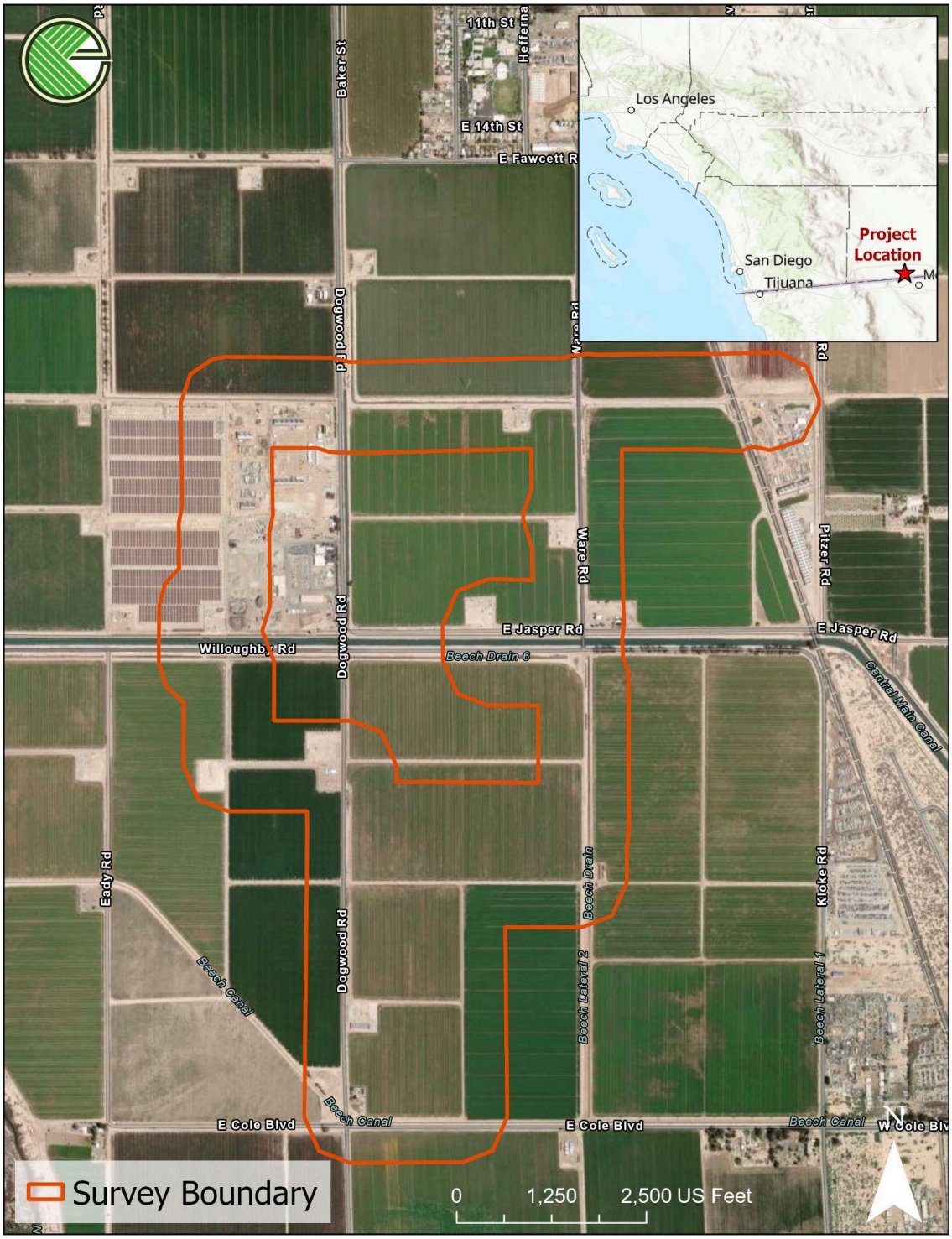
Photo 2. An overview of the habitat.

Photo 3. Potential bat roosting habitat within the project buffer.

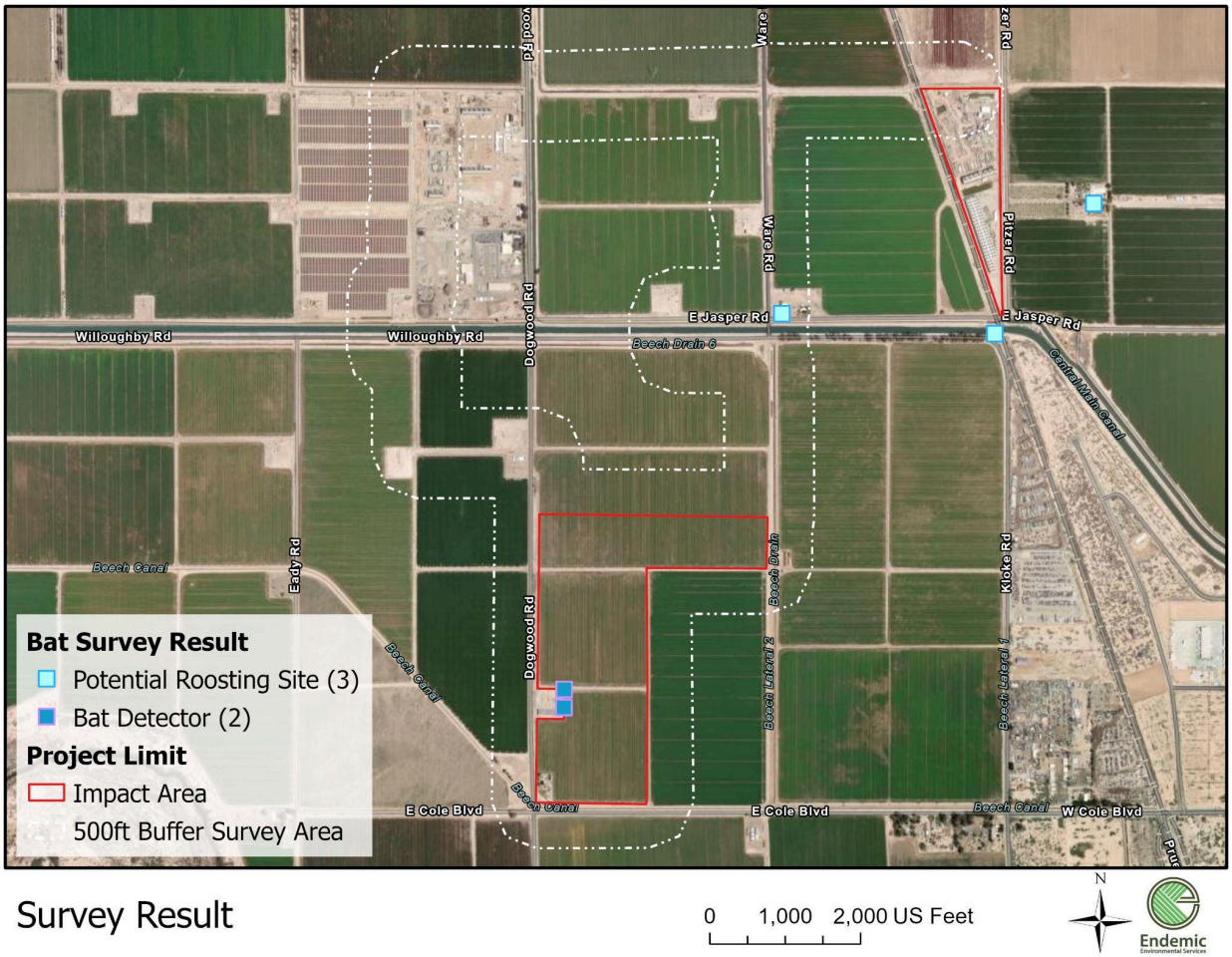
Photo 4. Potential bat roosting habitat within the project buffer.



Map 1. A vicinity map of the Project site location.



Map 2. A map of the survey boundary, including the 500-foot buffer.



Map 3. A map of the daytime habitat assessment survey results and bat detector locations.