



180 Grand Avenue
Suite 1050
Oakland, CA 94612
510.839.5066 [phone](#)
510.839.5825 [fax](#)

esassoc.com

memorandum

date September 8, 2023

to Samantha Engelage, City of Palo Alto

cc Christie Beeman, ESA

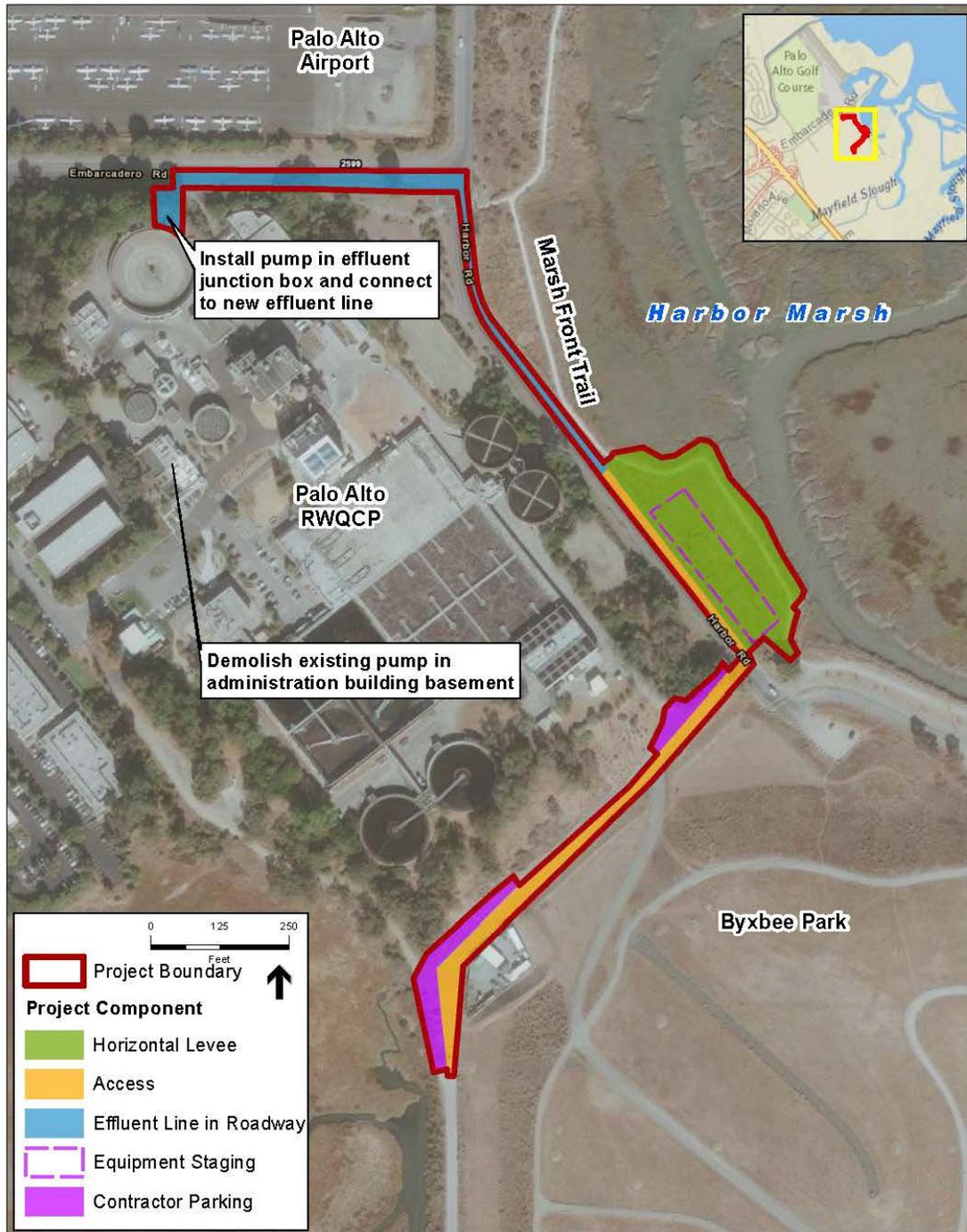
from Leonard Liu and Mandi McElroy, ESA

subject Palo Alto Horizontal Levee Pilot Project – Wildlife Hazard Analysis

This technical memorandum is an analysis of wildlife abundance and potential hazards to the Palo Alto Airport (Airport) by Environmental Science Associates (ESA) for The City of Palo Alto (City) for the proposed Palo Alto Horizontal Levee Pilot Project (Project). The Palo Alto Airport Comprehensive Land Use Plan (CLUP) (Windus 2008) requires the Airport Land Use Commission (ALUC) to evaluate any proposed uses that may cause a hazard to aircraft in flight within the Airport Influence Area (AIA). In addition, Federal Aviation Administration (FAA) Grant Assurances sections 20 and 21 (FAA 2022) and FAA Advisory Circular 150/5200-33C (FAA 2020) require the evaluation and appropriate corrective actions to the extent reasonable to ensure land use and projects such as this one are compatible with airport operations. The Project site is within the AIA, and the attraction of birds is a consideration for the potential effects on safe air navigation. The objective of this analysis is to characterize current bird use and activity in the Project study area and consider the potential for the Project to present new wildlife hazards to the Airport.

Background

The Project consists of a flood control levee with a gently sloping berm along the Bay shoreline that will provide transitional habitat between tidal wetlands and terrestrial uplands. Its target vegetation includes grassy wet meadow, freshwater/tidal brackish marsh, and riparian scrub – historical transitional habitat between uplands and tidal marshes which has been decimated by development along the Bay shoreline and is therefore a high restoration priority for resource agencies. The project involves excavating the existing levee, constructing a new 500-linear-foot levee berm, installing a new pump at the RWQCP, trenching a buried pipeline (effluent line) along Harbor Road and Embarcadero Road, vegetating the sloped area between the levee berm and the adjacent wetlands with native species, and routing treated effluent to the new horizontal levee adjacent to Harbor Marsh (ESA 2023) (**Figure 1**).



SOURCE: ESRI 2021; ESA 2022

Palo Alto Horizontal Levee Pilot Project. D201801306

Figure 1
Project Components

The FAA recommends 5,000 feet be maintained between the airport operation area (AOA) and new land uses considered incompatible with safe airport operations (e.g., landfills, wastewater treatment facilities, wetland mitigation projects) for an AOA serving piston-powered aircraft (FAA 2020).

Study Area

For the purposes of this analysis, the study area is defined as the area within 5,000 feet of the Airport AOA. Existing land uses within 5,000 feet of the Airport include a closed municipal landfill that has been converted to parkland (i.e., Byxbee Park), a regional wastewater treatment plant (i.e., the RWQCP), residential, commercial, and industrial developments and both developed and undeveloped recreational open space areas including extensive wetlands (i.e., the Palo Alto Baylands Nature Preserve).

The 3.56-acre Project site is directly adjacent to the RWQCP, Byxbee Park, a 100-acre golf course and 400 acres of wetlands. The Project site is located along the edge of the central reach of Harbor Marsh, an approximately 90-acre tidal salt marsh that has established within the former Palo Alto Yacht Harbor. The Project site is bounded by Harbor Marsh to the east, Embarcadero Road to the north, the RWQCP and Harbor Road (sometimes also referred to as Embarcadero Road) to the west, and the Byxbee Park parking lot entrance to the south. The Airport is located about 600 feet northwest of the proposed Project site. The site falls within the Airport's Traffic Pattern Zone, and a small portion of the tidal marsh portion of the site overlaps with the Outer Safety Zone (Windus 2008).

There are currently five biotic habitat types within the 3.56-acre project site: 2.06 acres of developed/landscaped, 1.34 acres of ruderal grassland, 0.14 acre of tidal salt marsh, 0.03 acre of muted tidal brackish marsh, and <0.01 acre of open water/tidal mudflat (**Table 1**). Developed/landscaped and ruderal grassland habitats support mostly non-native vegetation, including annual grasses and forbs as well as trees and shrubs. The marsh areas are dominated mostly by emergent hydrophytic and halophytic native vegetation (ESA 2023).

**TABLE 1
PRE-AND POST-PROJECT COMPARISON OF BIOTIC HABITATS ON THE PROJECT SITE**

Biotic Habitat/Land Use	Area (acres)				Add'l Change w/ SLR (from Post-Project)
	Existing Conditions	Post-Project	Change	Post-Project w SLR ^a	
Developed	2.060	2.060	+0.0005	2.060	-
Ruderal Grassland (buffer WOTS)*	0.090	-	-0.090	-	-
Ruderal Grassland (non-WOTS)*	1.245	-	-1.245	-	-
Native Grassland (buffer WOTS)	-	0.007	+0.007	0.003	-0.004
Native Grassland (non-WOTS)	-	0.690	+0.690	0.684	-0.006
Muted Tidal Brackish Marsh	0.029	-	-0.029	-	-
Riparian Scrub (buffer WOTS)	-	0.100	+0.100	0.064	-0.036
Stormwater Swale ⁺⁺	-	0.011	+0.011	0.011	-
Wet Meadow (above Treatment Zone) ⁺⁺	-	0.203	+0.203	0.135	-0.068
Wet Meadow (above Native Soils)	-	0.217	+0.217	-	-0.217
Tidal Marsh (Salt)*	0.139	-	-0.139	-	-
Tidal Marsh (Salt and/or Brackish)	-	0.275	+0.275	0.531	+0.256
Tidal Marsh (Salt/Brackish) (above Treatment Zone) ⁺⁺	-	-	-	0.075	+0.075
Open Water/Tidal Mudflat	0.002	0.002	-	0.002	+0.0004
<i>Subtotal – Non-jurisdictional:</i>	3.305	2.965	-0.340	2.965	-
<i>Subtotal – RWQCB jurisdictional:</i>	0.260	0.600	+0.340	0.600	-
TOTAL	3.565	3.565	-	3.565	-

SOURCE: Table compiled and revised by ESA, 2023

NOTES:

^a SLR = sea level rise of ~2.0 feet.

"-" Indicates zero or no change.

* Indicates an existing habitat type that appears to be permanently lost post-project, but is in fact entirely replaced by a new habitat category (i.e., Ruderal Grassland [buffer WOTS] replaced post-project by Native Grassland [buffer WOTS], and Tidal Marsh [Salt] replaced by Tidal Marsh [Salt and/or Brackish]).

⁺⁺ Indicates post-project features which should not be considered RWQCB jurisdictional, despite their position relative to the top of bank (because these features will function as part of the treatment system and require routine maintenance).

Bolded habitats = RWQCB jurisdictional.

Minor differences due to rounding errors; impact numbers revised to 3 decimal places (as compared to original application materials).

Methods

ESA downloaded data from eBird for the period 1/1/2022 to 6/30/2023 for 13 eBird hotspot locations within 5,000 feet of the Airport (**Figure 2**): O'Connor Pond (Bayshore Pond) area - Bay Trail and Faber-Laumeister Trails to Bay Rd. (SM), San Francisquito Creek mouth (SM Co.), San Francisquito Creek Mouth (SCL Co.), San Francisquito Creek Trail--Palo Alto Airport (SCL Co.), Palo Alto Baylands—Boardwalk, Palo Alto Baylands,

Palo Alto Baylands--Duck Pond, Trail (E. Bayshore Rd. to Bay Trail) on West side of San Francisquito Creek (SM Co.), San Francisquito Creek Trail--Geng Rd. (SCL Co.), Palo Alto Regional Water Quality Control Plant (restricted access), Byxbee Park, Mayfield Slough, and Emily Renzel Wetlands (eBird 2023).

ESA assigned bird observations to guilds and constrained guilds to gulls, raptors (hawk, eagle, owl, falcon, accipiter, harrier), and waterfowl (duck and goose). ESA then summed observation counts of each guild by date, location, and observer. ESA then took the maximum of the summed observation counts irrespective of observer for every date and location, to minimize overlapping observations at a location. Finally, ESA summed the maximum observations across locations for every date and the three guilds.



Figure 2. eBird observation points (yellow, green, orange, and red) around the Palo Alto Airport (eBird 2023).

Results

Waterfowl were the most numerous birds present in the study area, averaging 439 individuals observed per day during the study period, with a median of 251 observed per day and a maximum number of 3,788 observed on 1/9/2022. Gulls were almost as numerous, averaging 200 individuals observed per day during the study period, with a median of 60 observed per day and a maximum number of 4,048 observed on 2/12/2023. Raptors were far less common in the study area, with an average of 4.5 individuals observed per day during the study period, a median of 3 observed per day and a maximum number of 24 observed on 2/11/2023 (eBird 2023).

Waterfowl are most common in the study area during the fall, winter, and early spring months, reflecting the San Francisco Bay’s importance as a major stopover location on the Pacific Flyway for migratory birds (**Figure 3**). Gulls are most prevalent during the spring and summer months with occasional spikes in occurrence into the thousands, possibly related to pulses of food availability such as fish spawning events.

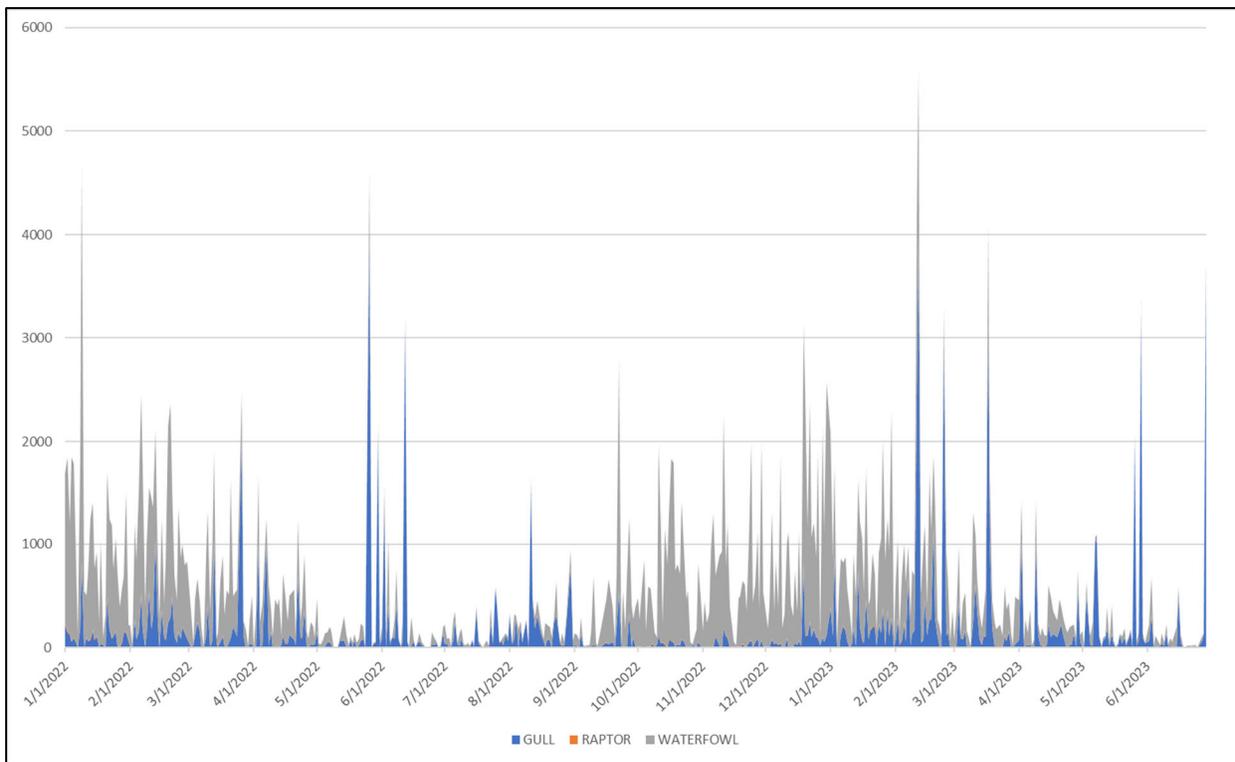
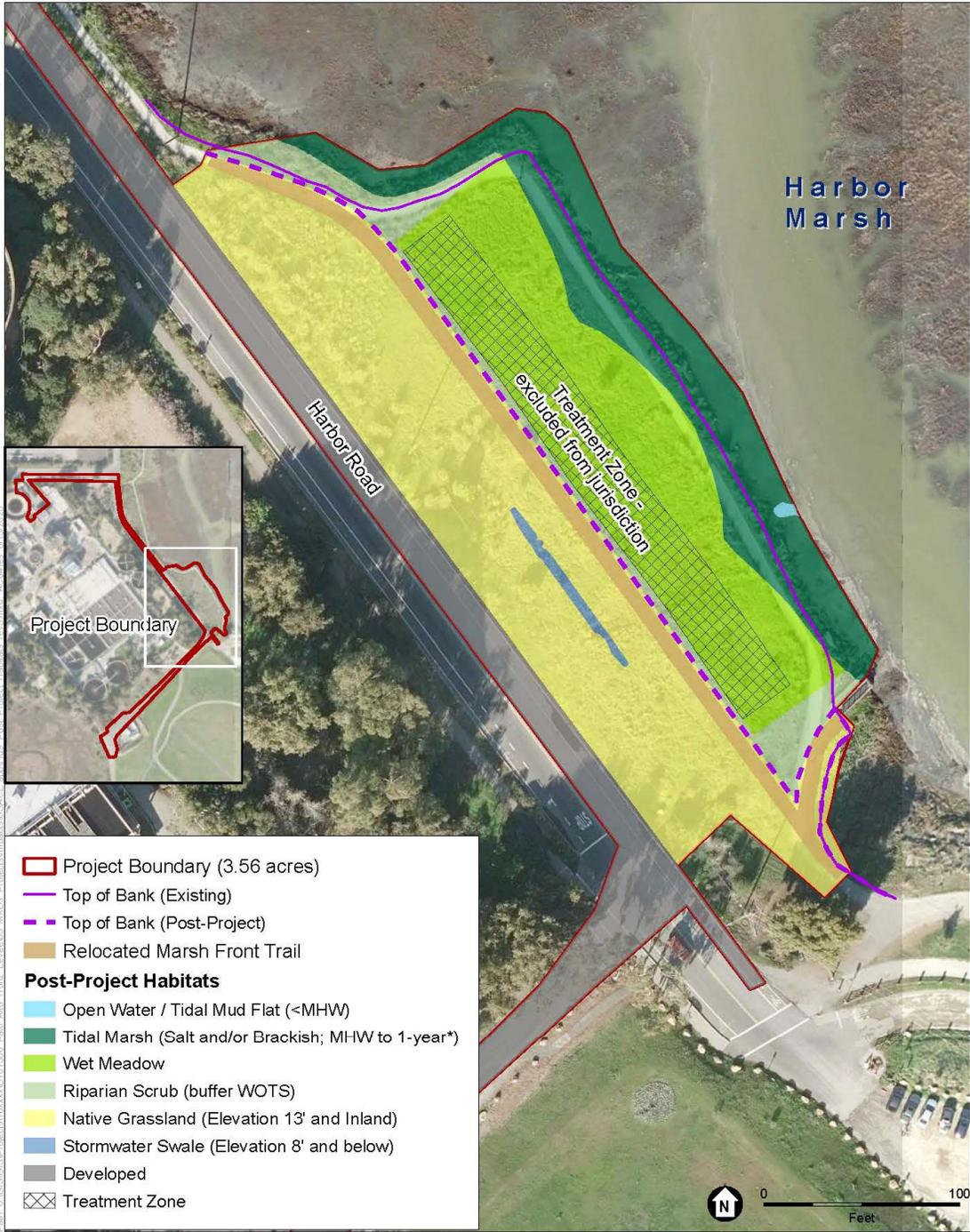


Figure 3. Distribution of bird observations during the study period; y-axis shows the number of individuals.

Discussion

The Project intends to convert approximately 1.34 acres of ruderal grassland to a mix of native grass, riparian scrub, wet meadow, tidal marsh and stormwater swale (**Table 1**). Existing developed land will remain developed post-construction and mainly represents underground facilities installed in this project (e.g., treated wastewater pipeline) (ESA 2023) (**Figure 4**). The 1.34 acres of proposed habitat conversion represents less than 0.1% of the study area.



SOURCE: H.T. Harvey and Assoc., 2021 and 2022; ESA, 2023 (revised)
 Notes: MHW = Mean High Water (6.75' NAVD88); HTL = High Tide Line (7.8' NAVD88); WOTS = Waters of the State
 * "Developed" habitat extends off figure frame within project boundary shown on inset.
 * MHW to 1-year= band of vegetation between MHW and the 1-year (annual) storm water surface elevation (=8.6'), which approximates the band of expected tidal marsh habitats.
 Top of Bank (Post-Project) overlaps with the Top of Bank (Existing) in the southeast corner of the site.

Palo Alto Horizontal Levee Pilot Project **Figure 4**
 Post-Project Created Habitats and RWQCB Jurisdiction



Ruderal grassland is not heavily used by gulls, raptors, or waterfowl. Gulls are scavengers and opportunistic predators, so they may occasionally use this habitat for foraging. Raptors will similarly forage opportunistically in ruderal grassland, as this habitat generally supports small mammal populations which are a cornerstone part of most raptors' diet. Waterfowl will forage in ruderal grassland, primarily in the winter and spring months when young sprouts are present. Gulls and raptors are unlikely to use the ruderal grassland as nesting habitat, due to the proximity to human disturbance. Waterfowl may use ruderal grassland for nesting, especially during a wet year when the vegetation grows more densely, but this is somewhat unlikely due to the presence of human disturbance and higher quality nesting habitat (e.g., islands within Harbor Marsh) in the vicinity. Gulls are very unlikely to use ruderal grassland as roosting habitat, as they prefer open areas. Raptors may occasionally roost in ruderal grassland, especially in scattered shrubs within the Project area, but are more likely to roost in the abundant trees around the Project area. Waterfowl may roost in ruderal grassland, especially in winter and spring when the vegetation is shorter, but they also prefer to roost in more open areas.

Riparian scrub habitat is planned to be composed of willows, native blackberry, elderberry, sedges and/or similar native vegetation (ESA 2021). Stormwater swale, wet meadow, and tidal marsh habitats are planned to be composed of rushes, sedges, tules, and numerous native annual and perennial forbs (ESA 2021). These four future habitats are not ideal for gulls but represent better habitats for raptors and waterfowl.

The future habitats can be expected to decrease gull foraging habitat due to decrease in scavenging opportunities as the habitats will be separated from human disturbance and less food-related trash will be present in the area, and they will remain unattractive for gull nesting and roosting due to the presence of vegetation. Raptors will have additional foraging opportunities due to the presence of small trees that will attract different prey. However, the increased vegetation density may decrease foraging as small mammals will have increased cover from aerial predators. The addition of small trees may also increase nesting and roosting by raptors, but likely only slightly as trees are abundant in the study area. Waterfowl may find some additional foraging, breeding, and resting opportunities in the converted habitats due to the expected dense native vegetation but are unlikely to be attracted in numbers significantly over what is already present since the converted habitat area represents less than 0.1% of the study area.

Conclusion

Land use within 5,000 feet of the Airport is currently dominated by suitable wildlife habitat such as wetlands, bay waters, a golf course, and landscaping associated with commercial and residential development. The Project, located on the perimeter of an existing 90-acre tidal marsh, will convert 1.34 acre of ruderal upland to riparian scrub and wetland habitat. Due to the anticipated habitat type conversion and small footprint of the Project relative to existing habitat conditions and baseline bird use in the study area, the potential for this Project to increase wildlife hazards to the Airport is anticipated to be negligible.

References

eBird Basic Dataset. 2023. Version: EBD_relJun-2023. Cornell Lab of Ornithology, Ithaca, New York.

Environmental Science Associates (ESA). 2021. Palo Alto Horizontal Levee Pilot Project Draft 60% Design. Prepared for City of Palo Alto. November 2021.

- 2023. Palo Alto Horizontal Levee Pilot Project, Nationwide Permit Pre-Construction Notification. Prepared for City of Palo Alto and San Francisco Estuary Partnership. January 2023.

Federal Aviation Administration (FAA). 2020. Advisory Circular 150/5200-32C Hazardous Wildlife Attractants on or near Airports. February 21, 2020.

- 2022. Airport Sponsor Assurances. https://www.faa.gov/sites/faa.gov/files/airports/new_england/airport_compliance/assurances-airport-sponsors-2022-05.pdf. May 2022.

Windus, W.B. 2008. Palo Alto Airport Comprehensive Land Use Plan. Adopted by Santa Clara County Airport Land Use Commission November 19, 2008; amended November 16, 2016.