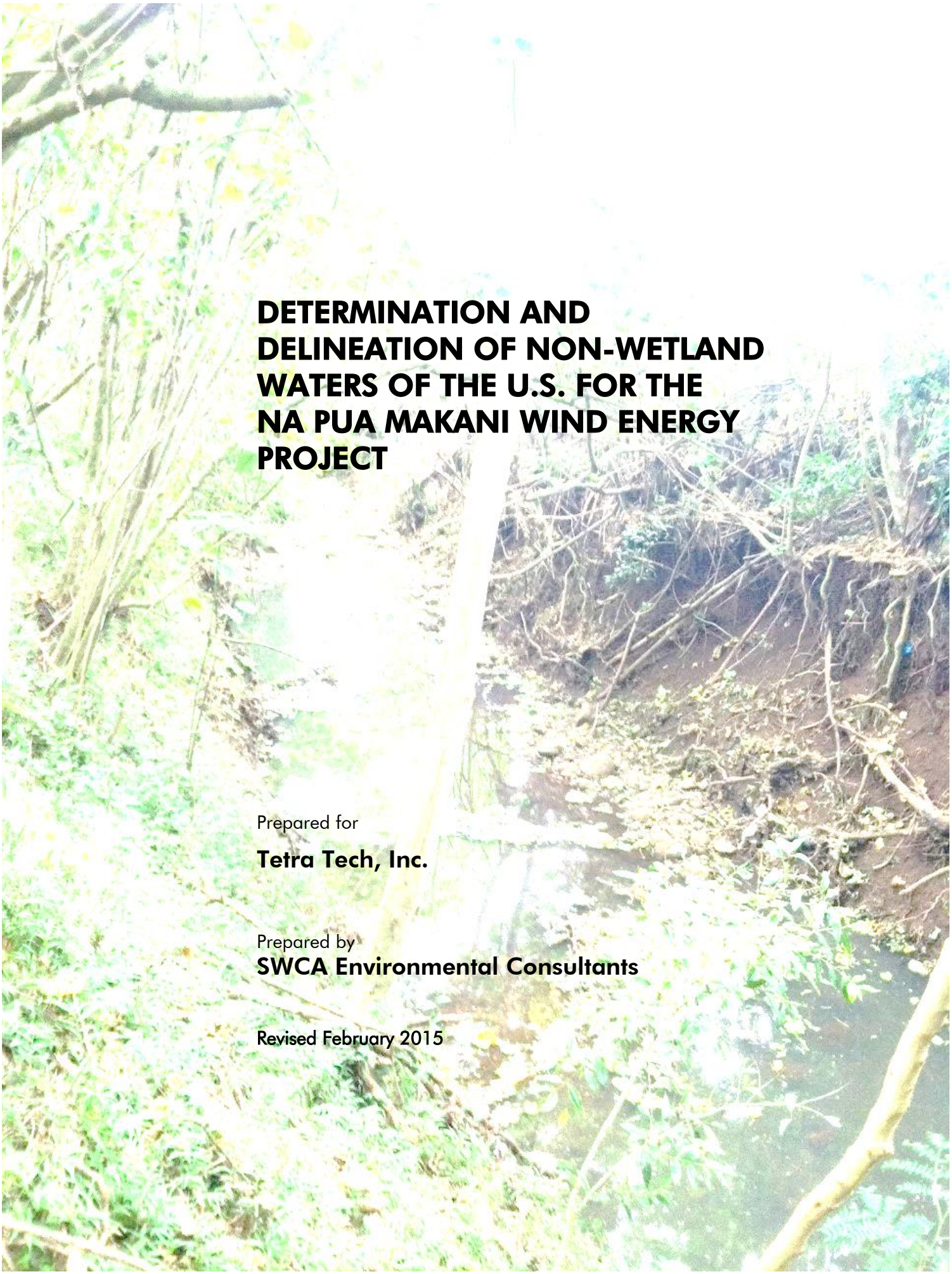
APPENDIX I
PRELIMINARY DETERMINATION AND DELINEATION OF NON-WETLAND WATER OF THE U.S.



DETERMINATION AND DELINEATION OF NON-WETLAND WATERS OF THE U.S. FOR THE NA PUA MAKANI WIND ENERGY PROJECT

Prepared for

Tetra Tech, Inc.

Prepared by

SWCA Environmental Consultants

Revised February 2015

DETERMINATION AND DELINEATION OF NON-WETLAND WATERS OF THE U.S. FOR THE NA PUA MAKANI WIND ENERGY PROJECT

Prepared for

Tetra Tech, Inc.
1750 SW Harbor Way, Suite 400
Portland, Oregon

Prepared by

SWCA Environmental Consultants
Bishop Square ASB Tower
1001 Bishop Street, Suite 2800
Honolulu, Hawai‘i
(808) 548-7922
www.swca.com

SWCA Project No. 28769

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WATERS OF U.S. DETERMINATION AND DELINEATION SUMMARY

PROJECT NAME: Na Pua Makani Wind Energy Project

SITE LOCATION: Kahuku, Island of Oʻahu, Hawaiʻi
Tax Map Keys (TMKs) 5-6-006:018, 5-6-008-006, and 6-6-008:006

APPLICANT: Champlin Hawaii Wind Holdings, LLC

SURVEY DATES: April 10, 2014; June 16, 2014; June 24, 2014; and January 16, 2015

PROJECT STAFF: Tiffany Bovino Agostini, Botanist/Project Manager
Bryson Luke, Field Technician
Taya MacLean, Wetland Specialist

SWCA Environmental Consultants (SWCA) was contracted by Tetra Tech, Inc. to conduct a determination and delineation of potential waters of the U.S. (WoUS) regulated by the Clean Water Act (CWA) within 59.17 acres (23.9 hectares [ha]) in Kahuku as part of the proposed Na Pua Makani Wind Energy project. SWCA conducted fieldwork on April 10, 2014; June 16, 2014; June 24, 2014; and January 16, 2015. The delineation was performed in accordance with U.S. Army Corps of Engineers (USACE) Regulatory Guidance Letter 05-05 (USACE 2005) for identifying the ordinary high water mark (OHWM) for non-tidal, non-wetland waters.

The proposed Na Pua Makani project involves the construction and operation of a wind energy generation project near the community of Kahuku on the north shore of Oʻahu. The survey area encompasses four non-contiguous areas that have the potential to intersect with project components such as roads, overhead transmission lines, and collection lines. It is within three TMKs: 5-6-006:018, 5-6-008:006, and 6-6-008:006. Elevations range from approximately 3 feet (0.9 meters [m]) to over 200 feet (60 m) above mean sea level.

Two intermittent streams (Keaʻaulu Gulch and ʻŌhiʻaʻai Tributary) and one perennial stream (Mālaekahana Stream) as well as an aqueduct and ditch have been identified in the survey area according to geospatial data from the State of Hawaiʻi and the U.S. Geological Survey. The National Wetlands Inventory also identifies a Palustrine Forested Wetland type (PFO3C) along the length of these stream courses.

SWCA delineated portions of three potential non-wetland WoUS in the survey area. Approximately 2,980 linear feet (908 m) of Keaʻaulu Gulch and 1,873 linear feet (571 m) of Mālaekahana Stream were delineated. Approximately 562 linear feet (172 m) of the main ʻŌhiʻaʻai Tributary and 264 linear feet (80 m) of the second, ephemeral ʻŌhiʻaʻai Tributary were delineated. All these features are potential WoUS due to the presence of an OHWM and their connection to the Pacific Ocean. If dredged or fill material will be placed either temporarily or permanently below their OHWMs, a preliminary or approved jurisdictional determination can be requested and a Section 404 permit may be required from the Honolulu USACE. A State 401 Water Quality Certification permit from the Clean Water Branch may also be required, which can take several months to a year to process. If the project can avoid placement of dredged or fill material either temporarily or permanently below the delineated OHWMs, SWCA recommends that a No Permit Required determination/letter be requested from the USACE. This conclusion is subject to confirmation by the USACE Honolulu District.

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ABBREVIATIONS

CFR	Code of Federal Regulations
CWA	Clean Water Act
DAR	Division of Aquatic Resources
GPS	global positioning system
ha	hectare(s)
m	meter(s)
MW	megawatt
mm	millimeter(s)
NRCS	National Resources Conservation Service
NWI	National Wetlands Inventory
OHWM	ordinary high water mark
SWCA	SWCA Environmental Consultants
TMK	Tax Map Key
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WoUS	Water(s) of the U.S.

1. INTRODUCTION

The U.S. Army Corps of Engineers (USACE) derives its regulatory authority over wetlands and other waters of the U.S. (WoUS) from two federal laws: Section 10 of the Rivers and Harbors Act of 1899, and Section 404 of the Clean Water Act (CWA) of 1972. The Rivers and Harbors Act of 1899 prevents unauthorized obstruction or alteration of navigable WoUS. *Navigable waters* are defined as waters that are "subject to the ebb and flow of the tide and/or presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce" (33 Code of Federal Regulations [CFR] 325.5(c)(2)). A Section 10 permit is required for non-fill discharging activities proposed in, over, or under WoUS.

Under Section 404 of the CWA, dredged and fill material may not be discharged into jurisdictional WoUS (including wetlands) without a permit. According to 40 CFR 230.3, WoUS subject to agency jurisdiction under Section 404 include navigable waters and their tributaries, interstate waters and their tributaries, wetlands adjacent to these waters, and impoundments of these waters. In addition, waters are protected by the CWA if determined to have a "significant nexus" with a traditional navigable water or interstate water (U.S. Environmental Protection Agency and USACE 2011). The U.S. Supreme Court's decision in the consolidated cases *Rapanos v. United States* and *Carabell v. United States* (126 S. Ct. 2208) provides further information regarding whether a wetland or tributary is a WoUS. A Section 404 permit is required for all fill or discharge activities below (seaward or makai) the high tide line in tidal waters or below the ordinary high water mark (OHWM) for non-tidal, non-wetland waters.

Tetra Tech, Inc. (in coordination with Champlin Hawaii Wind Holdings, LLC) is reviewing the proposed Na Pua Makani Wind Energy project pursuant to Section 10 of the Rivers and Harbors Act and Section 404 of the CWA. The project involves the construction and operation of a 24-megawatt (MW) wind energy generation project near the community of Kahuku on the north shore of Oʻahu, Hawaiʻi.

SWCA Environmental Consultants (SWCA) was contracted by Tetra Tech, Inc. to delineate the potentially jurisdictional WoUS in the vicinity of several project components (hereafter *survey area*). The survey area encompasses four non-contiguous areas. Two intermittent streams and one perennial stream are identified in the survey area according to geospatial data from the State of Hawaiʻi Division of Aquatic Resources (DAR), the U.S. Geological Survey (USGS), and the National Wetlands Inventory (NWI) program. This report summarizes the findings of the WoUS survey conducted by SWCA biologists Tiffany Bovino Agostini, Bryson Luke, and Taya MacLean on the following dates: April 10, 2014; June 16, 2014; June 24, 2014; and January 16, 2015.

2. DESCRIPTION OF SURVEY AREA

2.1. Location and Vicinity

The project area is in the Kahuku area on the northeastern portion of the Island of Oʻahu in the State of Hawaiʻi. The survey area is composed of four non-contiguous areas in the project area—Lower Keaʻaulu, Upper Keaʻaulu, ʻŌhiʻaʻai, and Mālaekahana. Together, these areas encompass approximately 59.17 acres (23.9 hectares [ha]) (Figure 1). The entire project area was not surveyed because only these four areas are anticipated to have project components that may intersect with potentially jurisdictional features. The survey area is located within Tax Map Keys (TMKs) 5-6-006:018, 5-6-008:006, and 6-6-008:006. The survey area is accessed from Enos Road, Mālaekahana Valley Road, and an unnamed road near mile marker 15 off Kamehameha Highway.

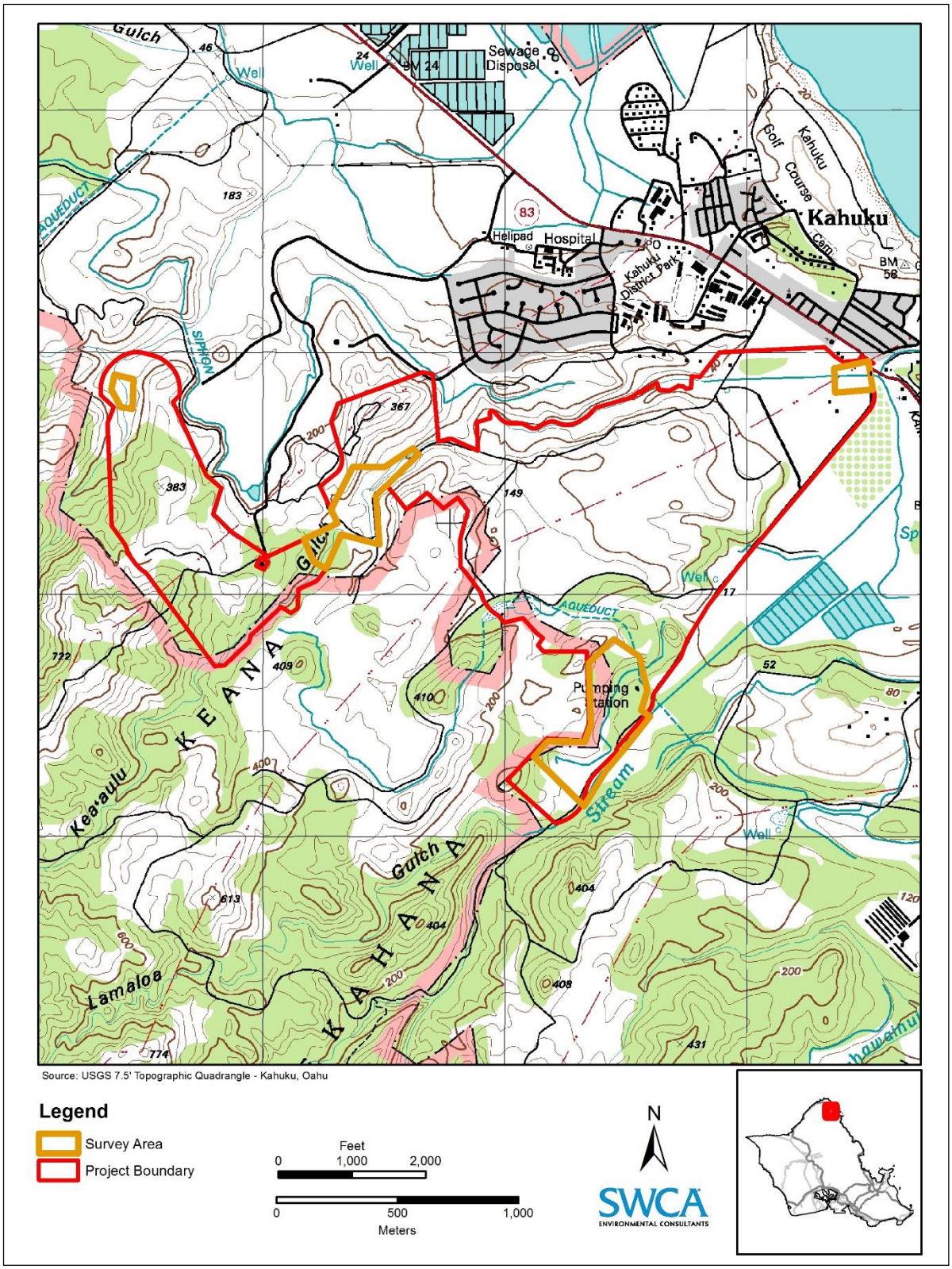

Figure 1. Location of survey area on the Island of O‘ahu.

2.2. Topography and Soils

Most of the survey area generally slopes from the southwest to the northeast. Near the ʻŌhiʻaʻai Tributary, the survey area slopes toward the northwest. Elevation at the survey area ranges from roughly 3 feet (0.9 meters [m]) near Kamehameha Highway to over 200 feet (60 m) above mean sea level in the more mauka (inland) sections.

The Natural Resources Conservation Service (NRCS) classifies eight soil types in the survey area: Mt (Mokuleia clay loam), HeB (Haleiwa silty clay, 2%–6% slopes), LaB (Lahaina silty clay, 3%–7% slopes), LaC (Lahaina silty clay, 7%–15% slopes), PeC (Paumalu silty clay, 3%–8% slopes), PeD (Paumalu silty clay, 15%–25% slopes), Pz (Paumalu-Badland complex), and KIA (Kawaihapai clay loam, 0%–2% slopes) (Foote et al. 1972; NRCS 2013). None of these soil types are considered hydric by the NRCS (NRCS 2012).

2.3. Hydrology

Most streams in the Kahuku area are considered to be naturally intermittent (Polhemus et al. 1992) and are typically short and steep, with permeable upland soils creating rapid infiltration into the Koʻolau aquifer. Numerous gulches cut into the upper portions of the Koʻolau Mountain Range and drain into the low-lying areas. Stream flow in the lowland areas have periods of high peak floods and little base flow (Hunt and De Carlo 2000).

Two intermittent streams (Keaʻaulu Gulch and ʻŌhiʻaʻai Tributary), one perennial stream (Mālaekahana Stream), one ditch/canal, and one aqueduct have been identified in the survey area according to geospatial data from the Hawaiʻi DAR and USGS. Keaʻaulu Gulch runs through dense vegetation in the central portion of the project area (Figure 2) and continues through various agricultural fields near the lower elevation survey area (Figure 3) before joining with Mālaekahana Stream just mauka (inland) of Kamehameha Highway. Mālaekahana Stream traverses the southern tip of the project area (Figure 4). It joins with Keaʻaulu Gulch before discharging to the ocean near Makahoa Point. ʻŌhiʻaʻai Tributary and Gulch run along the northwestern boundary of the project area (Figure 5). North of the survey area, ʻŌhiʻaʻai Tributary joins with a shorter tributary in the west and becomes Kiʻi Stream. This stream is referred to as Kiʻi ditch after crossing under Kamehameha Highway. It joins with Punamano ditch before entering the Kiʻi Unit of the James Campbell National Wildlife Refuge (Hunt and De Carlo 2000). Keaʻaulu Gulch, ʻŌhiʻaʻai Tributary, and Mālaekahana Stream are all listed on the *Atlas of Hawaiian Watersheds & Their Aquatic Resources* (Parham et al. 2008). A ditch/canal is identified as running roughly parallel to Mālaekahana Stream. An aqueduct is identified as intersecting with Mālaekahana Stream north of the survey area.

The NWI program identifies one wetland type in the survey area—PFO3C. This type is considered a Freshwater Forested/Shrub Wetland (Palustrine, Forested, Broad-Leaved Evergreen, Seasonally Flooded). The NWI features correspond with the locations of the three streams identified by DAR and USGS, and therefore are not displayed on the figures.

Annual average rainfall in the survey area is approximately 51.18 inches (1,300 millimeters [mm]) per year in the mauka areas and 45.47 inches (1,155 mm) near Kamehameha Highway. Rainfall is typically highest in March and lowest in June (Giambelluca et al. 2013). The nearby Kiʻi rainfall gage recorded less than average rainfall during 2014; the gage recorded 22% of the average monthly rainfall in April 2014 and 92% of average monthly rainfall during June 2014. In January 2015, the Kiʻi rainfall gage recorded roughly half the average rainfall (National Oceanic and Atmospheric Administration/National Weather Service Weather Forecast Office 2015).

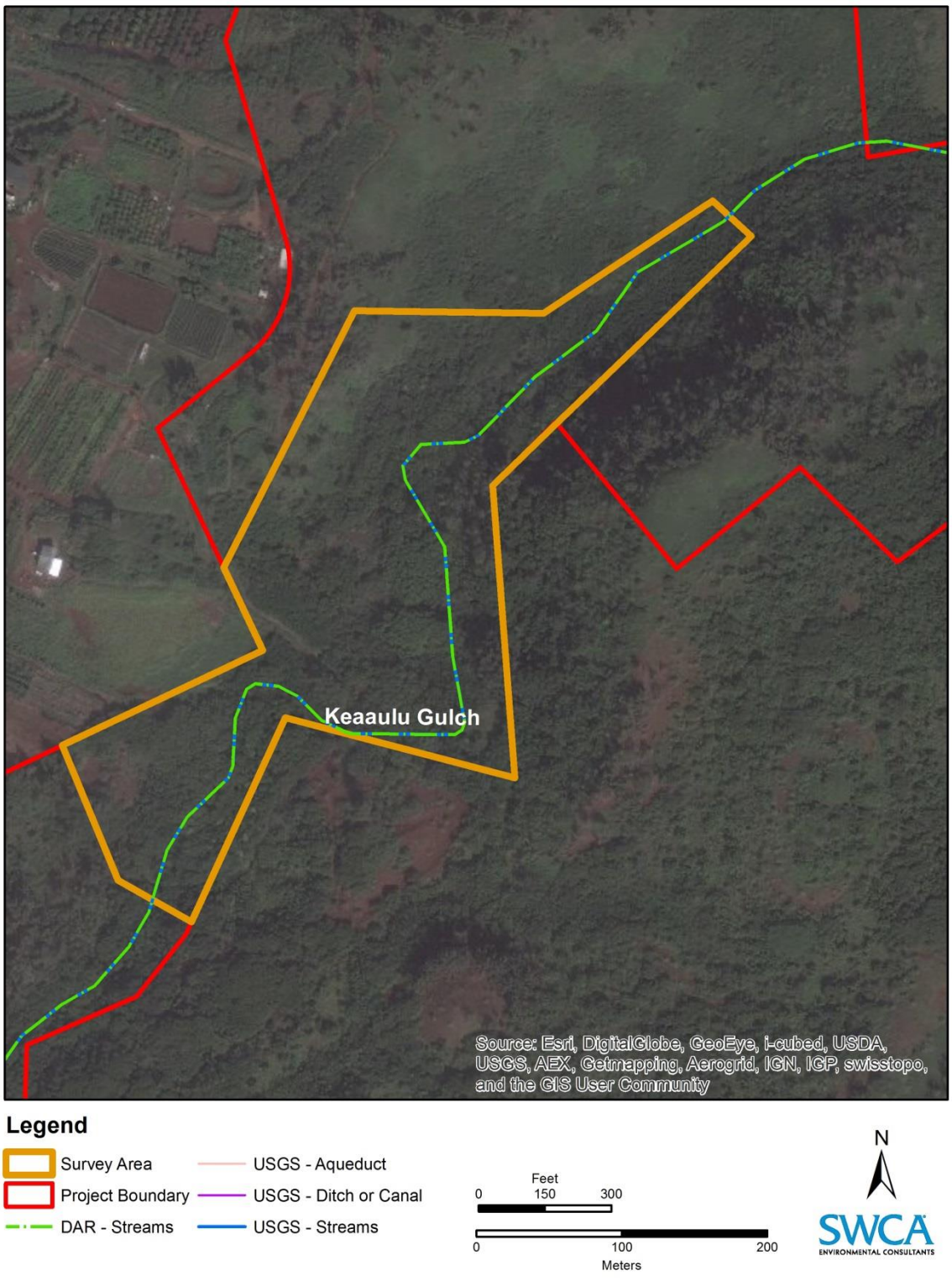

Figure 2. Upper Kea‘aulu survey area.

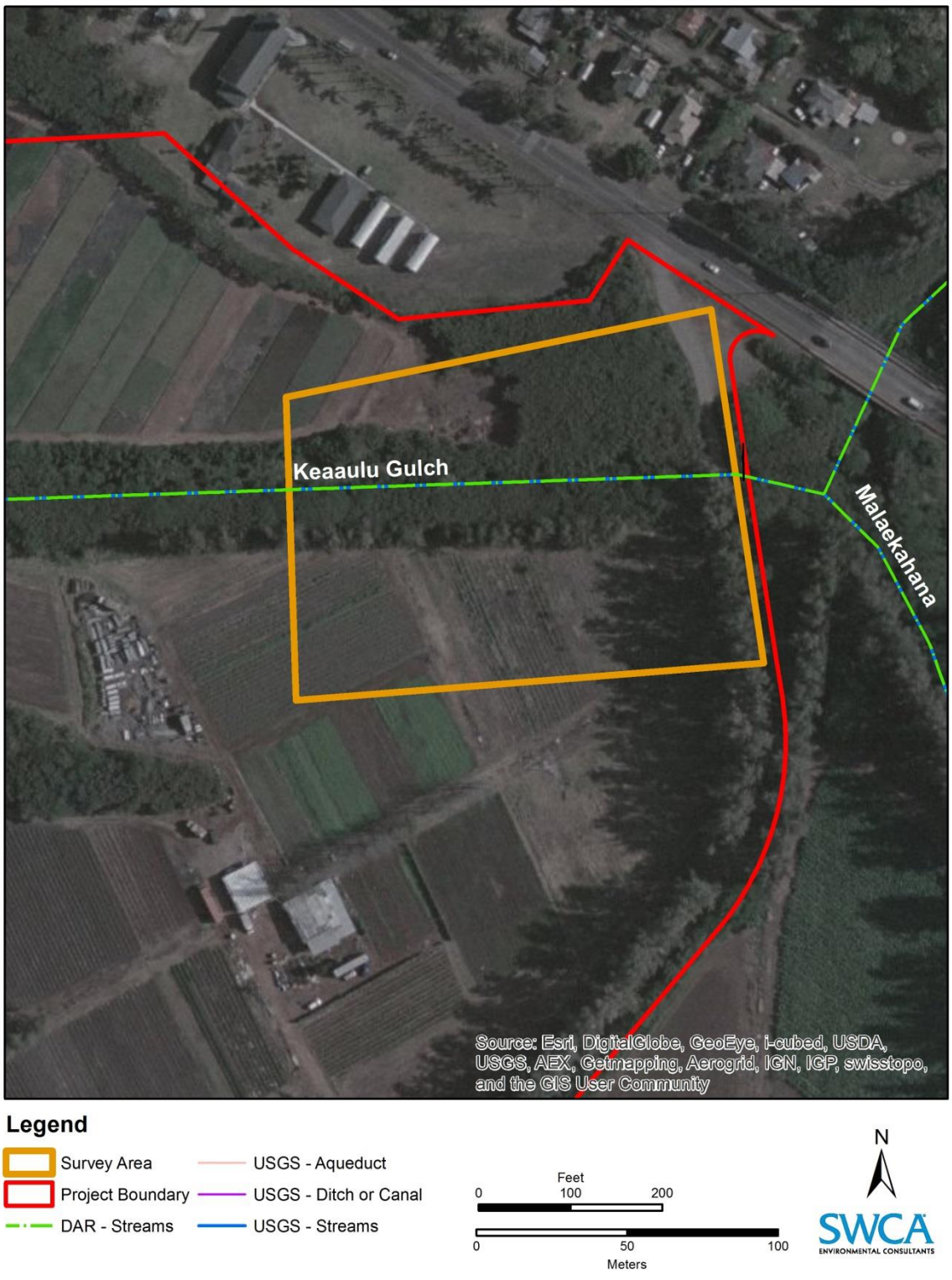

Figure 3. Lower Kea‘aulu survey area.

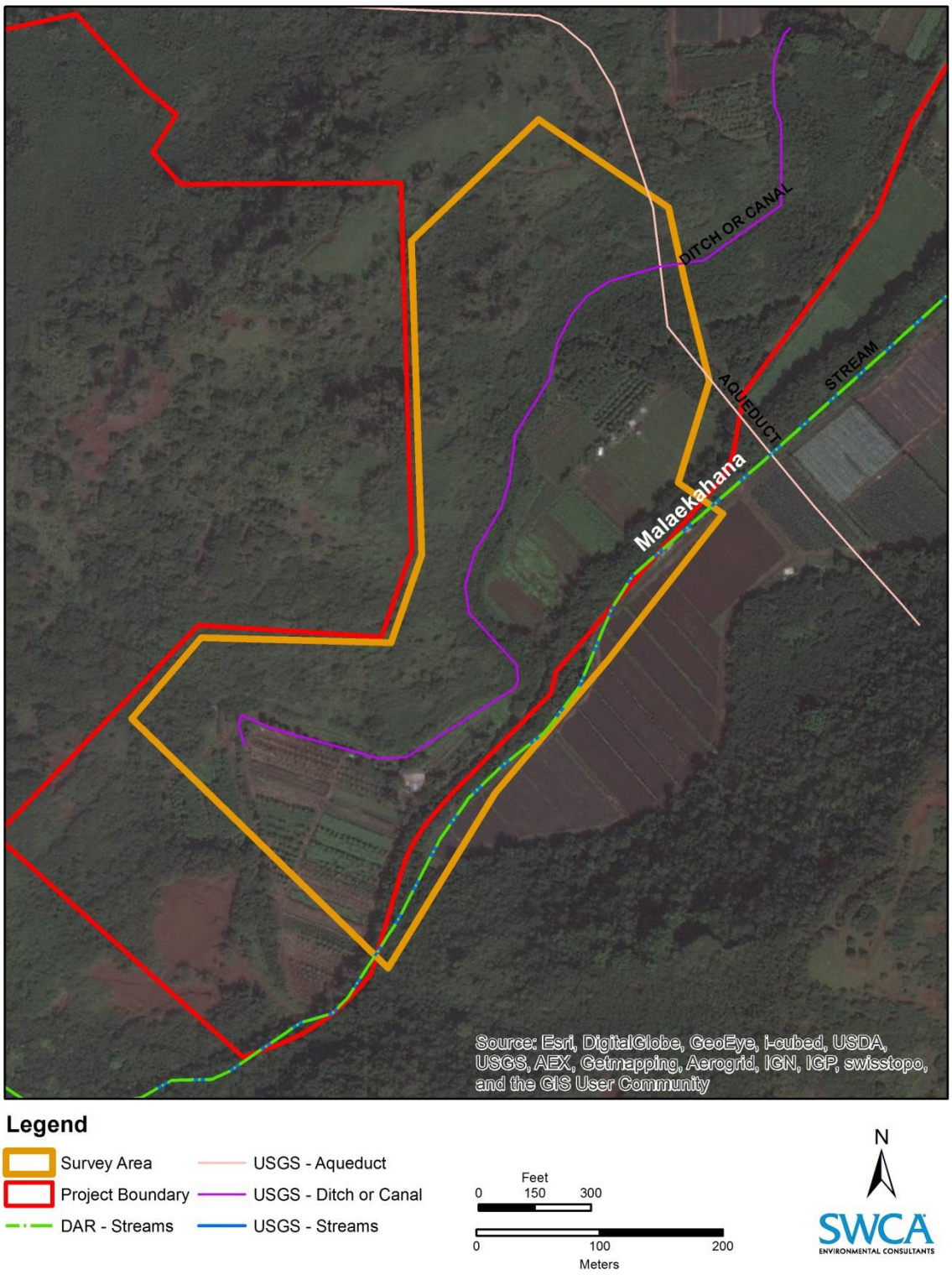

Figure 4. Mālaekahana survey area.

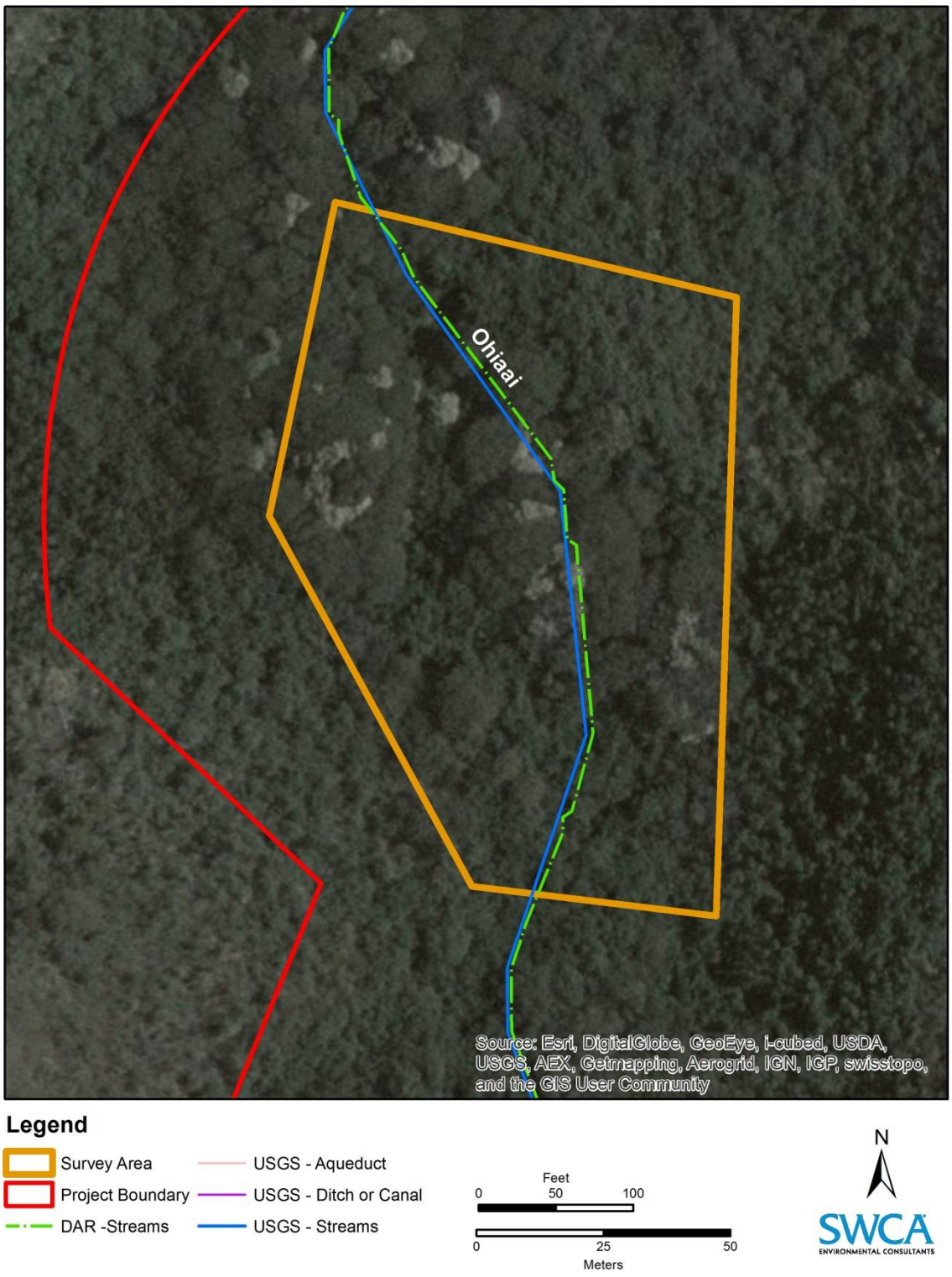

Figure 5. ʻŌhiʻaʻai survey area.

2.4. Flora and Fauna

The vegetation in the survey area is dominated by non-native species including koa haole (*Leucaena leucocephala*), Guinea grass (*Urochloa maxima*), and parasol leaf tree (*Macaranga tanarius*). Terrestrial fauna recorded in the area is predominantly non-native birds. The federally endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) and state endangered Hawaiian short-eared owl or pueo (*Asio flammeus sandwichensis*) likely inhabit or transverse the area. Endangered waterbirds known to occur at the nearby National Wildlife Refuge may pass through the area, including Hawaiian duck (*Anas wyvilliana*), Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian coot (*Fulica alai*), and Hawaiian gallinule (*Gallinula chloropus sandvicensis*). Finally, seabirds, particularly the endangered Hawaiian petrel (*Pterodroma sandwichensis*) and threatened Newell's shearwater (*Puffinus auricularis newelli*), may fly over the project area at night.

3. METHODS

Before the survey, SWCA reviewed NWI, USGS, and State of Hawai‘i data; geospatial data; aerial photographs; and topographic maps to identify potential wetlands or other WoUS in the survey area or the immediate vicinity. Information was also taken from the NRCS hydric soil data, as well as previous water resource reports and environmental assessments/environmental impact statements.

SWCA conducted field surveys on April 10, 2014; June 16, 2014; June 24, 2014; and January 16, 2015. SWCA walked the stream paths identified by USGS, NWI, and DAR, as well as low-lying areas. The boundaries of potential non-wetland WoUS were delineated by recording the location of the OHWM, as defined in the USACE Regulatory Guidance Letter 05-05 (USACE 2005). Indicators of OHWM can be physical or vegetative and include benches, shelving, drift lines, natural lines impressed on the bank, changes in the character of soil, transitions in vegetation type and density, destruction of terrestrial vegetation (matted-down vegetation), sediment deposition, presence of litter and debris, presence of wrack lines, bed and banks, multiple observed flow events, scour, sediment sorting, and water staining (USACE 2005, 2008).

SWCA documented the presence of OHWMs at various points along the streams and drainage features. For Kea‘aulu Gulch, SWCA mapped the centerline, recorded the maximum channel width, and buffered the centerline by half the width. In areas with open canopy, SWCA collected data points at the OHWM on both sides of Kea‘aulu Gulch. For Mālaekahana Stream, SWCA mapped the OHWM on the right bank and recorded the maximum channel width due to accessibility and because no project components are planned adjacent to the left bank. At ‘Ōhi‘a‘ai Tributary, SWCA combined methodology for mapping the centerline and left bank, depending on the density of canopy coverage and the feature width.

Data were collected using a Trimble GeoExplorer 2008 Series global positioning system (GPS) unit and Zephyr antenna, then post-processed in ArcGIS using GPS Correct to submeter accuracy. The linear lengths of the features were calculated by projecting these point/line data files in geographic information system software.

No attempt was made to determine "significant nexus" to a traditional navigable water by investigating whether the features discharge to the Pacific Ocean, or whether they may potentially affect the chemical, physical, and biological integrity of the ocean.

4. FINDINGS

In all, approximately three non-wetland WoUS were delineated in the survey area, including portions of Kea‘aulu Gulch, Mālaekahana Stream, and ‘Ōhi‘a‘ai Tributary. The types and acreage of the WoUS delineated by SWCA are summarized in Table 1.

Table 1. Potential Waters of the U.S. Delineated by SWCA in the Survey Area

Waters of the U.S. Identification	Type	Length (linear feet)
Kea‘aulu Gulch	Riverine – Intermittent	2,980
Mālaekahana Stream	Riverine – Perennial	1,873
‘Ōhi‘a‘ai Tributary	Riverine – Intermittent	826
Non-Wetland Total		5,679

4.1. Kea‘aulu Gulch

Approximately 2,980 linear feet (908 m) of Kea‘aulu Gulch were delineated in the survey area. Of this total, 2,491 linear feet (759 m) were in the upper survey area (Figure 6) and 489 linear feet (149 m) were in the lower survey area (Figure 7).

For most of the upper Kea‘aulu Gulch survey area, physical indicators of an OHWM are weak and the drainage appears ephemeral (i.e., driven purely by heavy precipitation events and lacking a groundwater component). In many areas the channel is overgrown by tall Guinea grass. No physical characteristics to indicate an OHWM were seen within a 135-foot (41-m) stretch immediately downstream of the sharp bend in the gulch; the most likely drainage course for this area is identified in Figure 6 as a single line. However, some physical indicators of an OHWM were observed in certain areas of the upper Kea‘aulu Gulch survey area. These include changes in the character of soil; shelving; benches; exposed root hairs; and vegetation that was matted down, bent, or absent (Figures 8 and 9).

Portions of the original drainage course were likely modified by human activities for roads, trails, and agriculture. Several culverts exist near the northern portion of the survey area (see Figure 9). A few culverts are within the stream channel, and at least two culverts appear to convey water to the channel from the east.

In the lower Kea‘aulu Gulch survey area, physical indicators of the OHWM were most apparent in the immediate vicinity of the existing Mālaekahana Valley Road bridge, and included destruction of terrestrial vegetation; change in plant community (upland to facultative species); and the presence of litter and debris. Standing water was observed in the immediate vicinity of the bridge. Further upstream, the drainage is overgrown with non-hydrophytic herbaceous vegetation along the bottom and slopes (Figure 10).

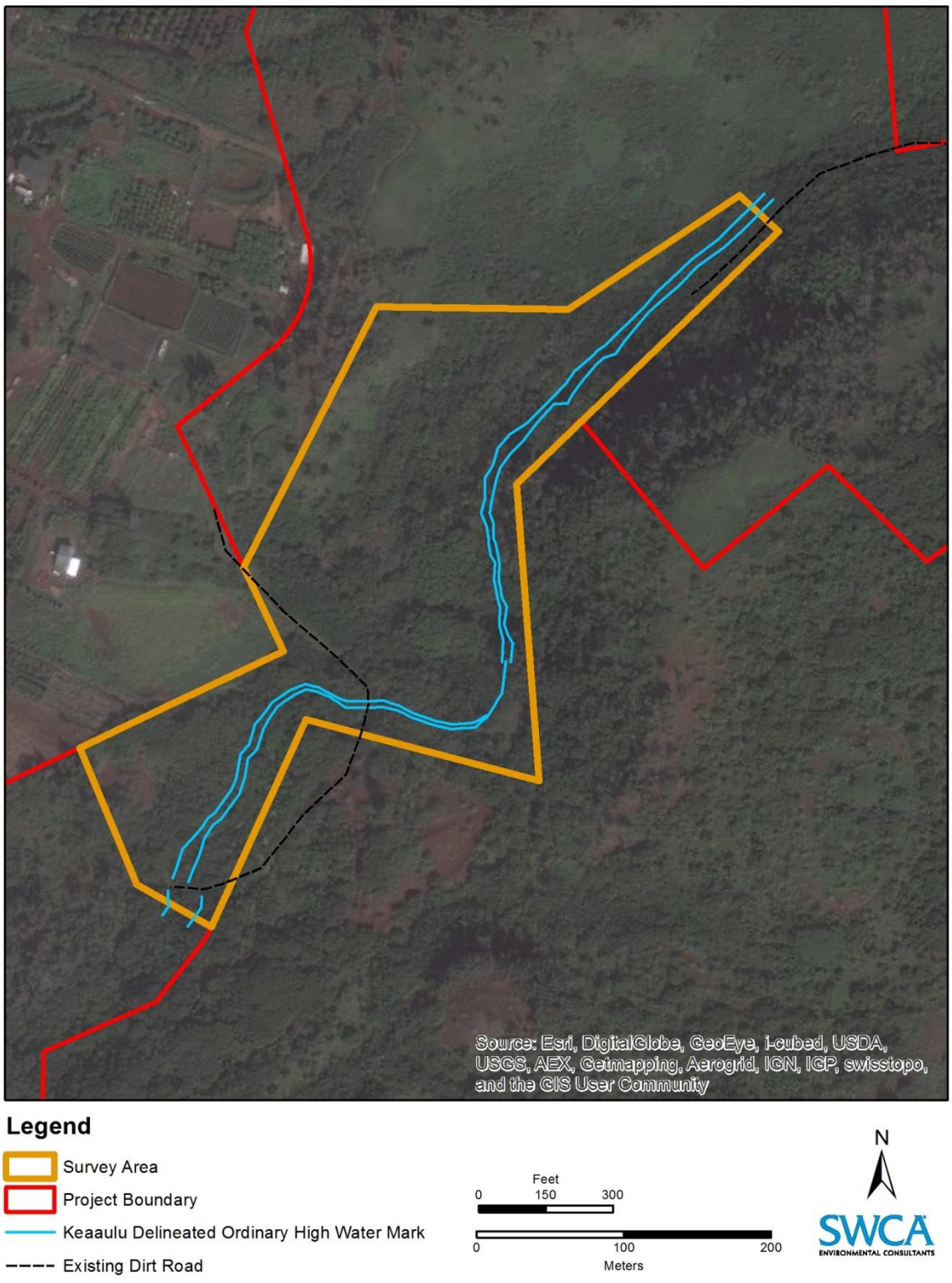

Figure 6. Delineated OHWM in the upper Kea‘aulu survey area.
Note: The break in the OHWM is a dirt road.

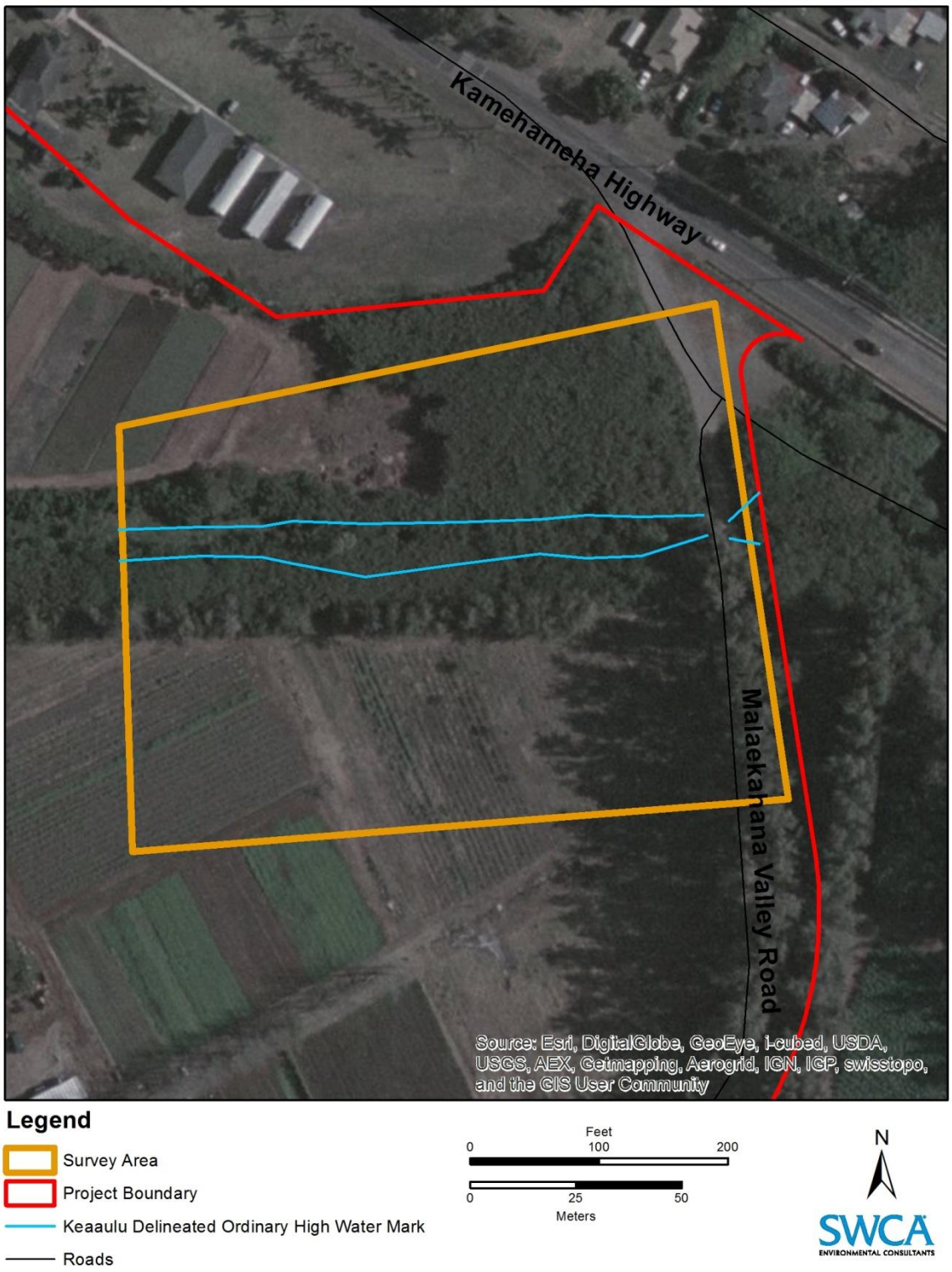

Figure 7. Delineated OHWM in the lower Kea‘aulu survey area near Kamehameha Highway. *Note:* The break in the OHWM is a bridge.

Figure 8. Looking toward the OHWM on right bank in the upper Kea‘aulu survey area.

Figure 9. Looking toward the OHWM on right bank in the upper Kea‘aulu Gulch survey area.

Figure 10. Overgrown channel in the lower Kea'aulu survey area.

4.2. Mālaekahana Stream

Approximately 1,873 linear feet (571 m) of Mālaekahana Stream were delineated in the survey area (Figure 11). Mālaekahana Stream is perennial. It has a defined bed and bank with flow present throughout the year. Various indicators of the OHWM were seen throughout the Mālaekahana survey area, including a clear, natural line impressed on the bank; organic debris collecting behind obstructions; exposed root hairs; and benches (Figure 12).

The ditch/canal identified by the USGS in the Mālaekahana survey area (see Figure 4) appears to have been filled in and is no longer active. It was likely excavated in uplands and was not observed to contribute flow (either directly or indirectly) to another potentially jurisdictional water.

During SWCA's survey, water was observed in the narrow, human-made channel identified as an aqueduct by USGS data (see Figures 4, 11, and 13). The edges were densely vegetated with upland species. The feature did not continue east of the road, and therefore does not appear to connect to Mālaekahana Stream.

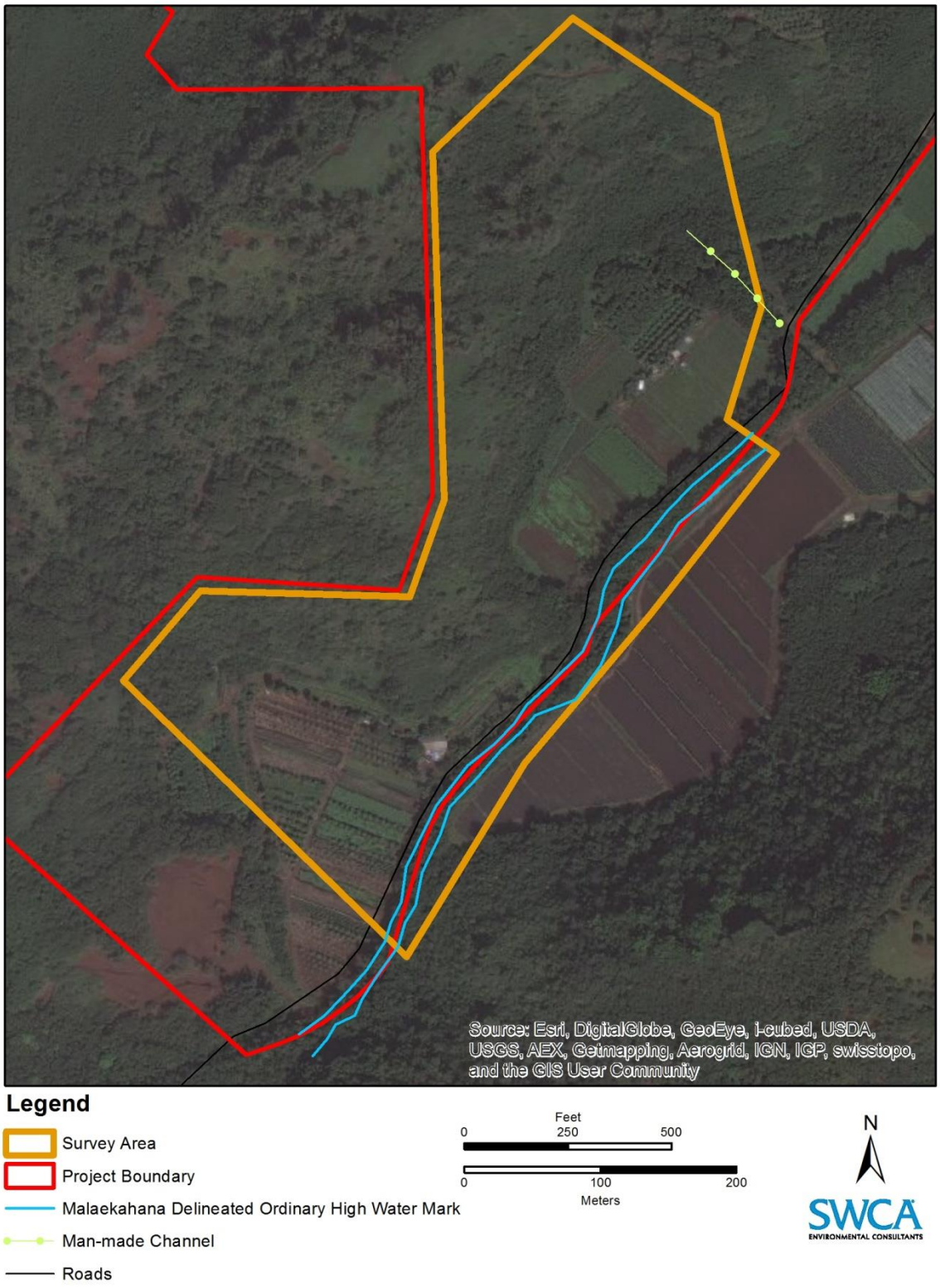

Figure 11. Delineated OHWM in the Mālaekahana survey area.

Figure 12. Mālaekahana Stream with standing water.

Figure 13. Narrow, human-made channel identified by the USGS as an aqueduct in the Mālaekahana survey area.

4.3. ʻŌhiʻaʻai Tributary

Two tributaries were delineated in this portion of the survey area, although only one feature is identified in the NWI, USGS, or DAR maps of the area. Approximately 562 linear feet (172 m) of the main stem of ʻŌhiʻaʻai Tributary were delineated in the survey area (Figure 14). The main stem of ʻŌhiʻaʻai Tributary is intermittent, with surface water flow during wetter months or high rainfall events, but interspersed by dry periods. The bed and bank are well defined, with the bank reaching over 5 feet (1.5 m) in some areas. Various indicators of OHWM were seen throughout the ʻŌhiʻaʻai survey area, including a clear, natural line impressed on the bank; undercut banks; sediment sorting and changes in soil character; organic debris collecting behind obstructions (wracking); litter removal due to flowing water; water staining on boulders; exposed roots; and standing water (Figures 15 and 16).

A smaller tributary was also identified during the survey. Approximately 264 linear feet (80 m) of this feature were delineated (see Figure 14). It flows northwest and directly connects to the main portion of ʻŌhiʻaʻai Tributary described above (Figure 17). It is likely to be ephemeral; flowing briefly only during rainfall events or extreme flooding. Indicators of flow were not strong throughout the entire feature, but included matted or missing vegetation, a well-defined bed and bank, and change in soil character (Figure 18).

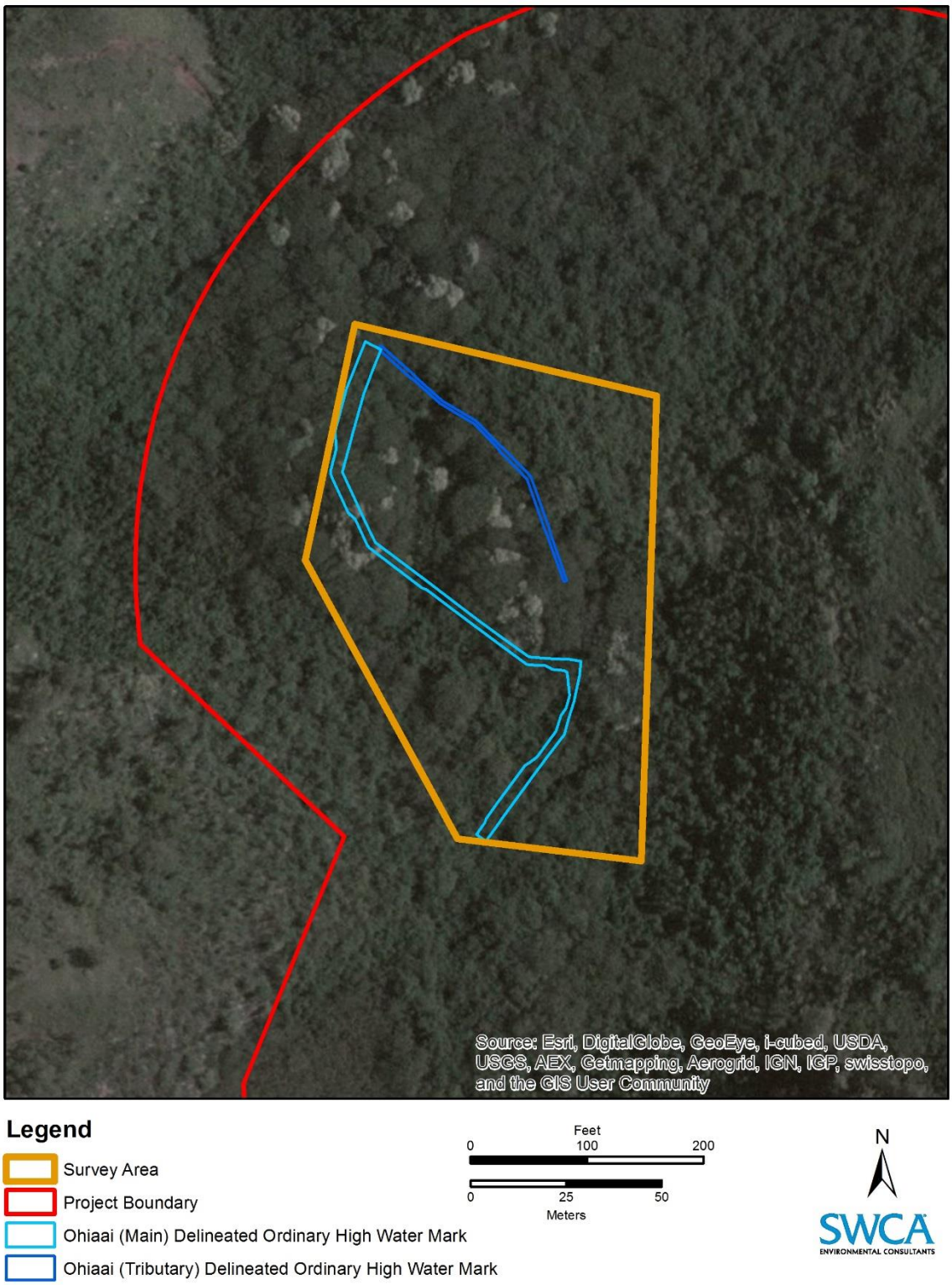

Figure 14. Delineated OHWM in the ʻŌhiʻaʻai survey area.

Figure 15. Main ʻŌhiʻaʻai Tributary indicators include cut banks, exposed roots, scour, and standing water.

Figure 16. Water-stained leaves collected on an elevated obstruction along the ʻŌhiʻaʻai Tributary.

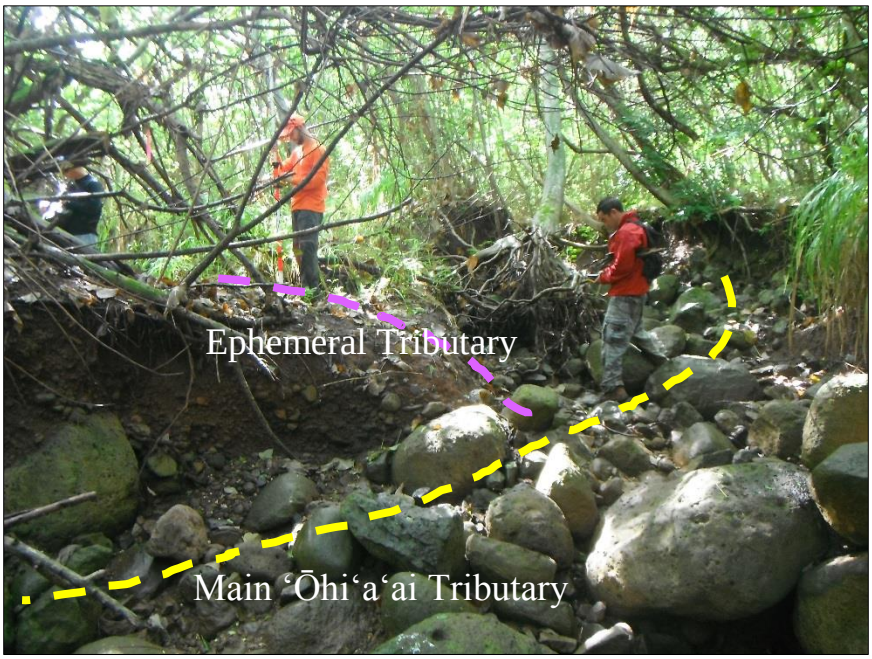

Figure 17. Junction between the ephemeral tributary (pink line) and the main ʻŌhiʻaʻai Tributary (yellow line).

Figure 18. Ephemeral ʻŌhiʻaʻai tributary showing defined bed and bank and unvegetated channel bottom.

5. CONCLUSIONS AND RECOMMENDATIONS

SWCA surveyed and delineated three potentially jurisdictional streams in the survey area. Approximately 2,980 linear feet (908 m) of the intermittent Keaʻaulu Gulch, 1,873 linear feet (571 m) of the perennial Mālaekahana Stream, and 826 linear feet (252 m) of the intermittent ʻŌhiʻaʻai Tributary were delineated in the survey area. In contrast to the Mālaekahana Stream and ʻŌhiʻaʻai Tributary, Keaʻaulu Gulch did not have strong indictors of flow or an OHWM in many areas. Portions of Keaʻaulu Gulch were likely modified by human activities for roads and agriculture. However, it may convey water and sediment from upland areas to lower reaches and subsequently the Pacific Ocean during heavy rainfall events.

It is not known whether the project will require placement of dredged or fill material either temporarily or permanently below the delineated OHWMs. If this can be avoided, SWCA recommends requesting a preliminary jurisdictional determination and a No Permit Required letter from the Honolulu USACE. If the project requires placement of dredged or fill material below the delineated OHWMs, a preliminary or approved jurisdictional determination can be requested, and a permit may be required from the USACE if the features are determined to be WoUS. A State 401 Water Quality Certification permit from the Clean Water Branch may also be required, which can take several months to a year to process. Because portions of Keaʻaulu Gulch lack strong indicators of an OHWM, the jurisdictional status of the gulch could be argued via the approved jurisdictional determination process.

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