

**54-183 HAUULA HOMESTEAD ROAD
HONOLULU COUNTY, HAWAII**

WETLAND SURVEY REPORT

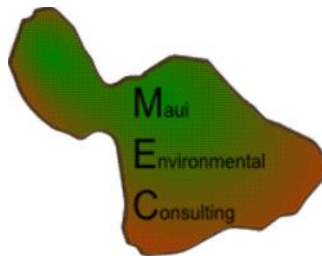
Prepared for:



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August 3rd, 2016

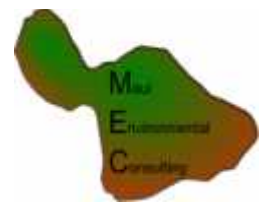
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A handwritten signature in black ink, appearing to read 'M. Reyes', is written over a horizontal line.

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Senior Ecologist/Principal



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1.0 INTRODUCTION

Maui Environmental Consulting, LLC (MEC) was retained by Alakea Construction Services (Alakea) to survey wetlands occurring on the 54-183 Hauula Homestead Road Project (Hauula Project) located in Tax Map Key (TMK) 54 007:006 in Honolulu County, Hawaii (TMK Map). More specifically, this project is located west of Kamehameha Highway and south of Kukuna Road (Location Map). The purpose of this survey was to determine the jurisdictional limits of wetlands within the project boundary in accordance with The U.S. Army Corps of Engineers (USACE) 1987 Wetlands Delineation Manual and the 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Hawaii and Pacific Islands Region (Version 2.0) suitable for submittal to the Hawaii Department of Health Clean Water Branch and the USACE.

2.0 METHODOLOGY

The following sections describe the methods used by MEC to determine the approximate locations and jurisdictional boundaries of existing wetland communities within the Hauula Project. The project area is a 0.46-acre vacant lot.

2.1 Preliminary Review

Information on the potential occurrence of wetlands was collected by MEC through literature and data review. To establish the approximate locations and boundaries of existing wetland communities within the Hauula Project, available site-specific data were collected and reviewed using the following resources and methods (see References for complete source information):

-) Infrared and True color aerial imagery of the study area
-) U.S. Department of Agriculture (USDA)/Natural Resource Conservation Service (NRCS) Soil Survey for Honolulu County, Hawaii
-) U.S. Geological Survey (USGS) Topographic Quadrangle maps
-) FWS Classification of Wetlands and Deepwater Habitats of the United States
-) FWS National Wetland Inventory (NWI)
-) State of Hawaii, Office of Planning Geographic Information System Data Portal

2.2 Survey Methods

Wetland boundaries were determined in accordance with the USACE 1987 Wetlands Delineation Manual and the 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Hawaii and Pacific Islands Region (Version 2.0). These delineation methods emphasize that wetland determinations are based on the identification of specific hydrologic requirements, including the presence of hydric soils, a dominance of hydrophytic vegetation, hydric soil conditions (periodic, continuous, or saturated), and other indicators of hydrologic conditions, such as inundation, moss collars, and the presence of muck soils. Wetlands observed in the field



were delineated using the above criteria, and the location of each wetland flag used to mark wetland limits was recorded using a global positioning system (GPS). The wetland is depicted on the Wetland Map.

In addition to establishing the wetland boundaries and characteristics, MEC personnel evaluated the wetland to determine if it is within the Rivers and Harbors Act jurisdiction or Clean Water Act jurisdiction based on the 40 CFR 230.3 (2) definitions of “*Waters of the United States*”.

3.0 RESULTS

3.1 Soil Descriptions

Based on the USDA/NRCS Soil Survey for Honolulu County, two soil types are mapped within the Hauula Project (Soils Map). One is classified as hydric according to the *NRCS Web Soil Survey*. Listed below are the two soil types found on the Hauula property and a general description of their characteristics.

(MZ) Marsh – This soil is very poorly drained, nearly level with 0 to 2 percent slopes, and frequently flooded. Typically, the surface layer is mucky peat about 60 inches thick. This soil type makes up less than 25 percent of the property boundary. This soil type is ponded for most of the year, and the high water table is at or near the surface for the remainder of the year. According to the *NRCS Web Soil Survey* this is a hydric soil.

(LoB) Lolekaa Silty Clay, 3 to 8 Percent Slopes – This soil is well drained, moderately sloping, and found on terraces and foot slopes of upland habitats. This soil is classified as prime farmland. Typically, the surface layer is silty clay about 10 inches thick. The subsurface layer is silty clay from 10 inches to a depth of about 42 inches. The third layer is typically paragravelly loam from 42 inches to a depth of 65 inches. This soil type makes up more than 75 percent of the property boundary. Depth to water table is more than 80 inches. This is not a hydric soil according to the *NRCS Web Soil Survey*.

3.2 Wetland Survey Results

MEC conducted the wetland survey on July 26th, 2016. MEC personnel located one wetland totaling 0.1 acres± of jurisdictional wetland area within the Hauula Project (Wetland Map). This wetland is considered a forested/shrub wetland at both the northern and southern boundaries of the property but tapers into an emergent wetland or marsh makai of the property. A general description of the wetland is found below. The general description includes hydrologic indicators used to determine wetland limits and a justification of the classification as USACE jurisdictional for the wetland (see Appendix A – Wetland Determination Data Forms for more detailed information). Seasonal high water (SHW) was recorded using the highest extent of adventitious roots located on the trunk of a hau tree. SHW was determined to be roughly five inches above the water level observed during the field event and eight inches above the wetland soil (See Appendix B: Photo Document).



Freshwater Forested/Shrub Wetland

This portion of the wetland is found north and south and just outside of the property boundary. This portion of the wetland has steep slopes and is heavily vegetated. Dominant canopy species include hau tree (*Hibiscus tiliaceus*) and Java plum (*Syzygium cumini*). Both plant species are considered invasive to Hawaii. Little to no shrub or ground cover species are present in this portion of the wetland due to dense canopy cover. Observed indicators of wetland hydrology included the dominance of hydrophytic vegetation, inundation, stain lines, and the presence of adventitious roots on hydrophytic vegetation (eight inches above wetland soil surface). Because of the hydrological connectivity of this wetland to offsite wetlands ultimately connecting to the ocean, this wetland is considered to be within the USACE Clean Water Act jurisdiction.

Freshwater Emergent Wetland/Marsh

This portion of the wetland is located on the eastern portion of the property as you are heading makai. This wetland is dominated by herbaceous wetland species including buffalo grass (*Urochloa mutica*), uki or sawgrass (*Cladium jamaicense*), and primrose willow (*Ludwigia octovalvis*). Observed indicators of wetland hydrology included the dominance of hydrophytic vegetation, inundation, and the presence of hydric soils. Because of the hydrological connectivity to offsite wetlands ultimately connecting to the ocean, this wetland is considered to be within the USACE Clean Water Act jurisdiction.

3.3 Protected Lands

The Hauula Project was evaluated for the potential occurrence of Critical Habitat as defined by the Endangered Species Act of 1973, as amended, and 50 CFR and other publically protected lands. The FWS regulates the adverse modification of the biological or physical constituent elements essential to the conservation of the listed species within the Critical Habitat. There are no lands designated as Critical Habitat within or adjacent to the Hauula Project. The closest known Critical Habitat is 0.86 miles southwest of the project site. In addition, the project is 0.15 miles west of the Special Management Area (SMA) as designated by Hawaii Revised Statutes (HRS) Chapter 205A, the Coastal Zone Management (CZM) law. This project will therefore not require a SMA permit. Lastly, this project is located 0.14 miles east of the Hauula Forest Reserve boundary (Protected Lands Map).

3.4 Protected Waters

Both the Freshwater Forested/Shrub and Freshwater Emergent portions of the wetland located on the Hauula Project are noted in the National Wetlands Inventory (Protected Waters Map). It should be noted that the wetland boundaries depicted in the Protected Waters Map are approximate. Aerial imagery was the primary data source used to detect these wetlands and wetland locations depicted by this shapefile are considered imprecise (Cowardin). Maakua Stream is located 0.15 mile north of the project and Hauula Stream is located 0.2 mile south of the project.



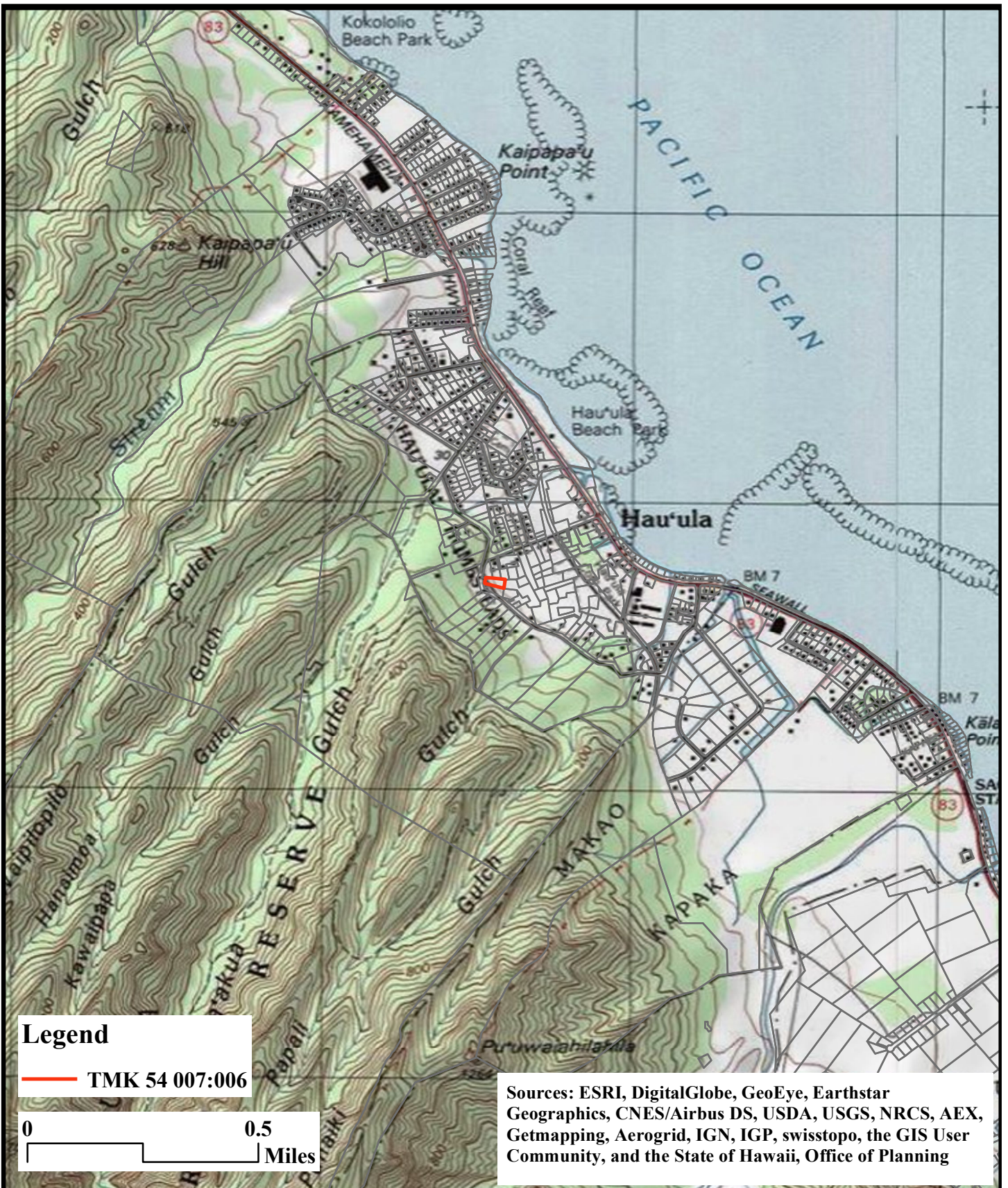
4.0 SUMMARY

Based on research and field investigations, it was determined that one wetland occurs at the eastern edge of the Hauula project totaling approximately ± 0.1 acres of the overall project site. This wetland is within the Clean Water Act jurisdiction, based on the 40 CFR 230.3 (2) definitions of “*Waters of the United States*”. No other protected waters are found near the Hauula Project. The project is located outside the SMA, is not in a forest reserve or near critical habitat.



REFERENCES

- Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research Center.
- U.S. Army Corps of Engineers (USACE) Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual – Wetlands Research Program Technical Report – Y-87-1.
- USACE Environmental Laboratory. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Hawaii and Pacific Islands Region (Version 2.0).
- U.S. Department of Agriculture (USDA)/Natural Resource Conservation Service (NRCS) Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii. 1972.
- U.S. Geological Survey (USGS) Topographic Quadrangle Maps. Online resources available from <http://topomaps.usgs.gov/>.
- U.S. Fish and Wildlife Survey (FWS). National Wetland Inventory (NWI). Online resources available from <http://www.fws.gov/wetlands/Data/Mapper.html>.



Legend
 — TMK 54 007:006

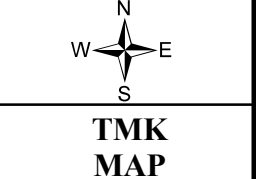


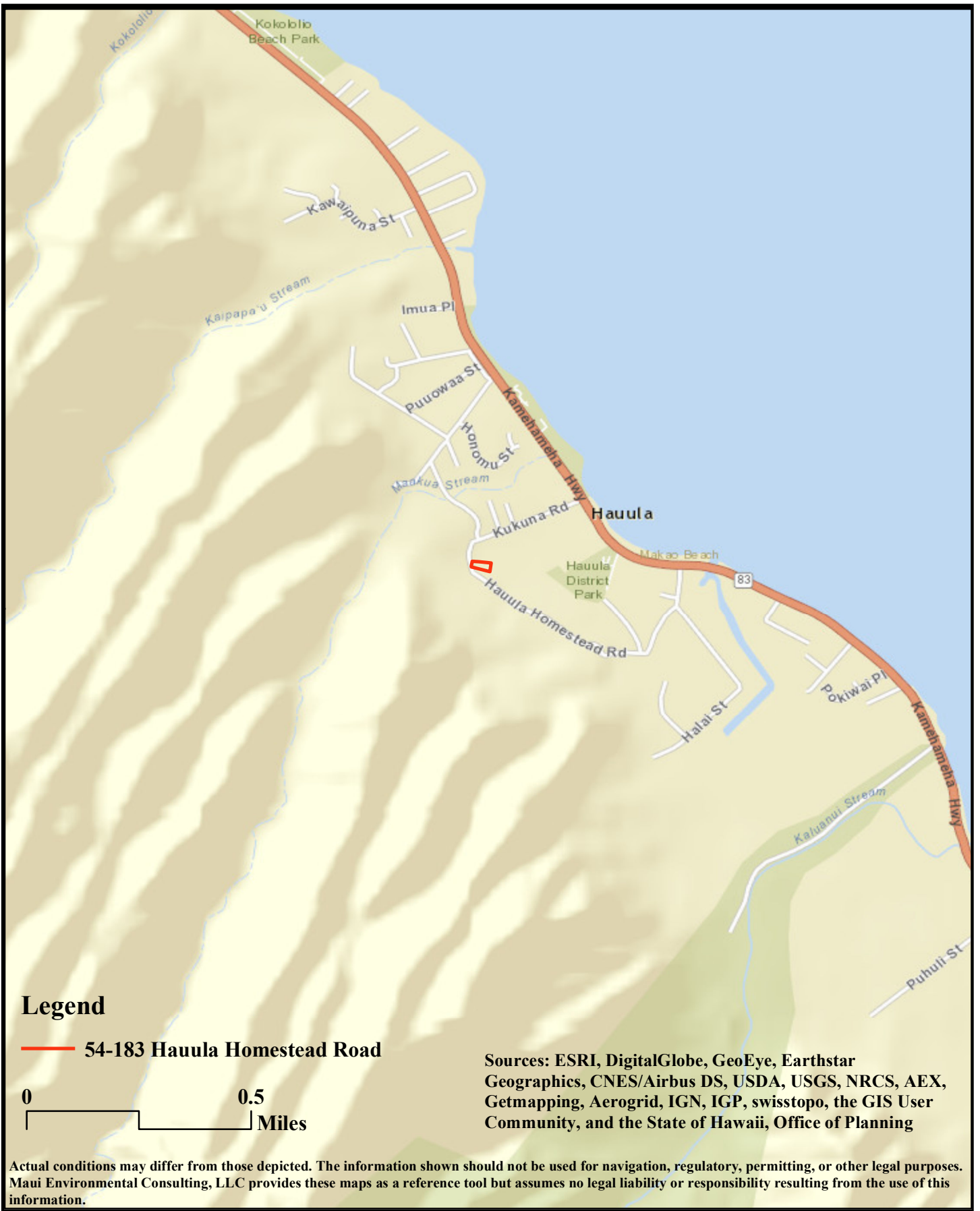
Sources: ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, NRCS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, the GIS User Community, and the State of Hawaii, Office of Planning

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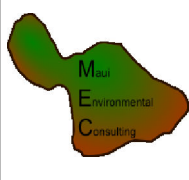
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 54-183 Hauula Homestead Road



Sources: ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, NRCS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, the GIS User Community, and the State of Hawaii, Office of Planning

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**LOCATION
MAP**

Soil Unit Symbol	Soil Unit Name	Hydric Soil
MZ	Marsh	Yes
LoB	Lolekaa silty clay, 3 to 8 percent slopes	No



Legend

- 54-183 Hauula Homestead Road
- NRCS Soils



Sources: ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, NRCS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, the GIS User Community, and the State of Hawaii, Office of Planning

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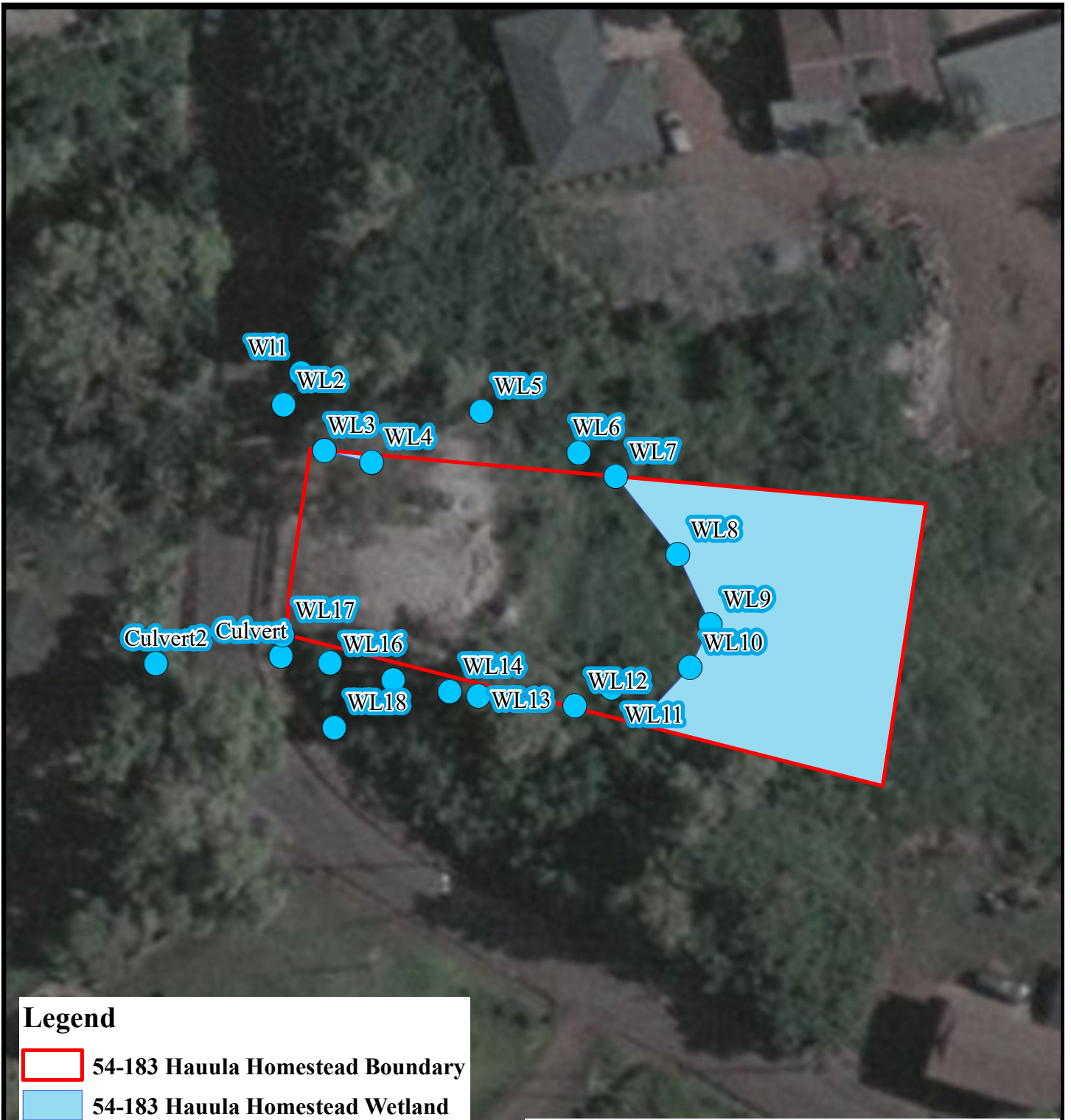


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HONOLULU COUNTY, HI



**SOILS
MAP**



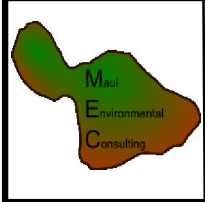
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- 54-183 Hauula Homestead Boundary
- 54-183 Hauula Homestead Wetland
- Wetland Points



Sources: ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, NRCS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, the GIS User Community, and the State of Hawaii, Office of Planning

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HONOLULU COUNTY, HI



**WETLAND
MAP**

Legend

— 54-183 Hauula Homestead Road

▨ Critical Habitat

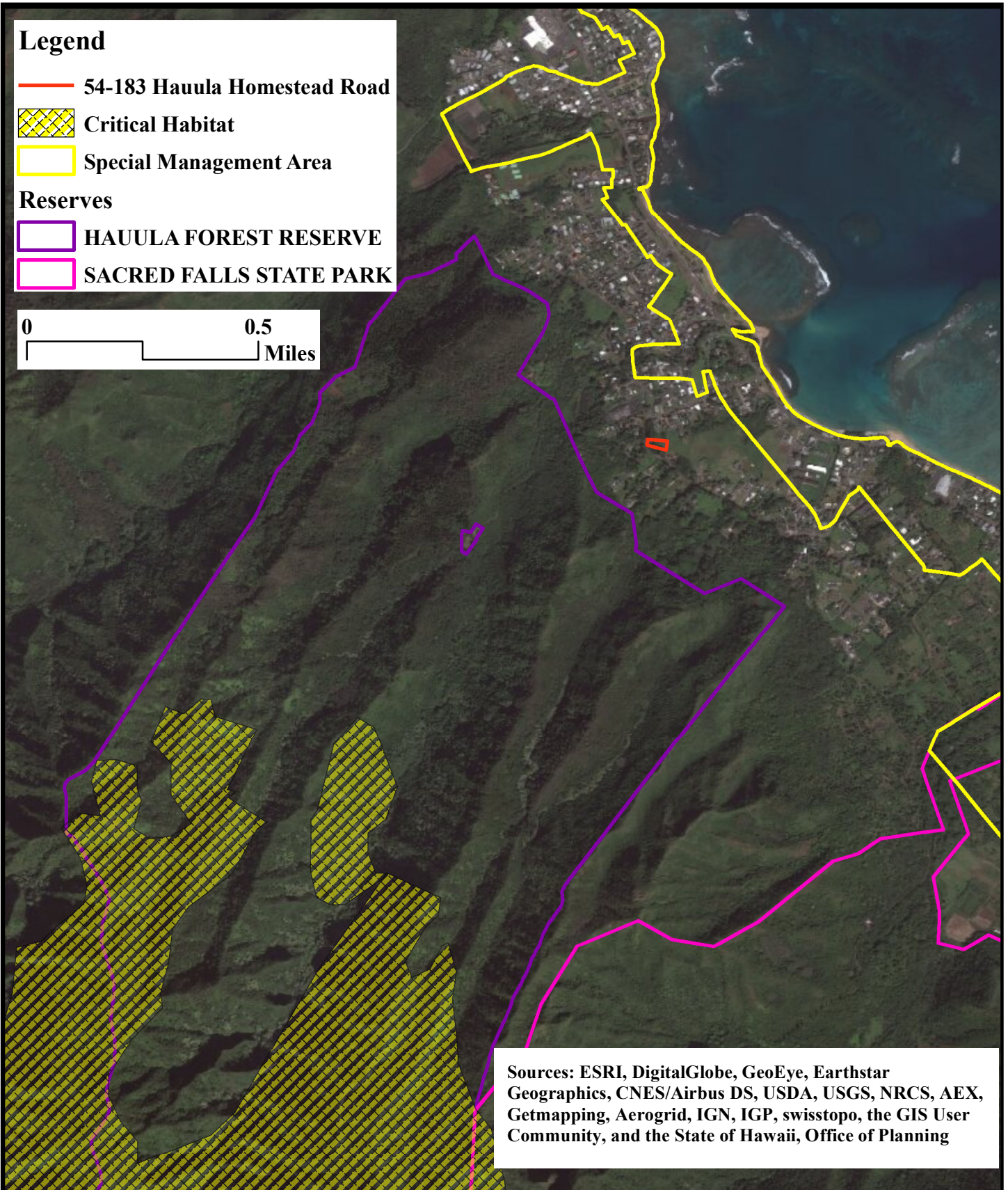
□ Special Management Area

Reserves

□ HAUULA FOREST RESERVE

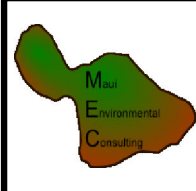
□ SACRED FALLS STATE PARK

0 0.5 Miles

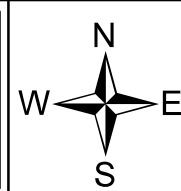


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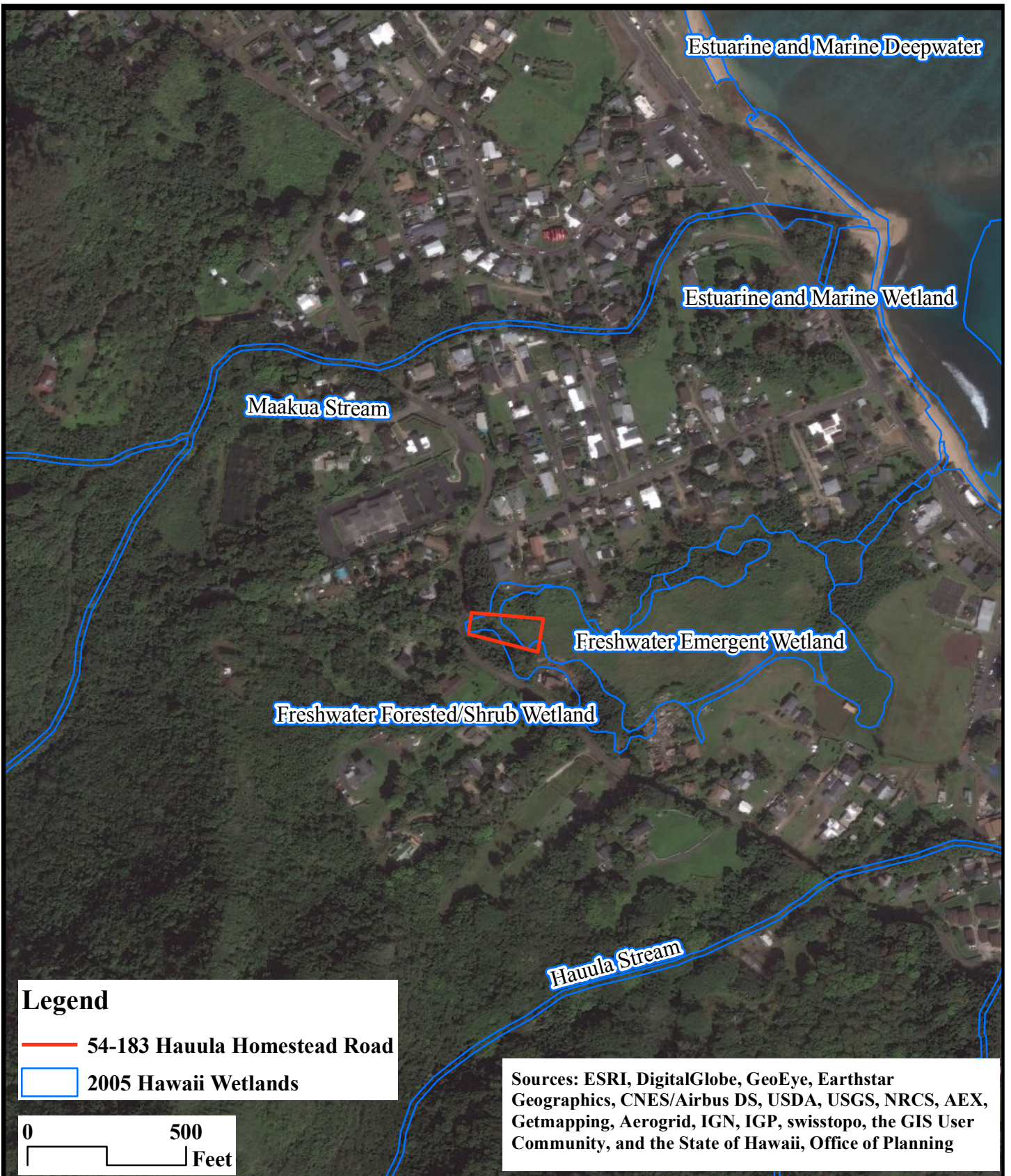
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**PROTECTED
LANDS
MAP**



Legend

- 54-183 Hauula Homestead Road
- 2005 Hawaii Wetlands



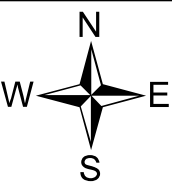
Sources: ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, NRCS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, the GIS User Community, and the State of Hawaii, Office of Planning

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**PROTECTED
WATERS
MAP**

Appendix A: Routine Wetland Data Form

WETLAND DETERMINATION DATA FORM – Hawai'i and Pacific Islands Region

Project/Site: 54-183 HAVULA City: HAVULA Sampling Date: 9/26/16 Time: 13:45

Applicant/Owner: NICK DENZER State/Terr/Comth.: HI Island: OAHU Sampling Point: _____

Investigator(s): MSR TMK/Parcel: _____

Landform (hillslope, coastal plain, etc.): COASTAL PLAIN Local relief (concave, convex, none): _____

Lat: _____ Long: _____ Datum: _____ Slope (%): _____

Soil Map Unit Name: MZ MARSH NWI classification: _____

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

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

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

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

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No _____	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____	
Remarks: <u>SOILS ARE HIGHLY DISTURBED JUST OUTSIDE WETLAND DUE TO HISTORIC LAND USE</u>			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>HAU HIBISCUS TILIACEUS</u>	<u>90</u>	<u>Y</u>		Number of Dominant Species That Are OBL, FACW, or FAC: <u>90</u> (A)
2. <u>JAVA PLUM</u>	<u>5</u>			Total Number of Dominant Species Across All Strata: <u>90</u> (B)
3. <u>- SYZIGIUM CUMINI</u>				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (AVB)
4. _____				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
5. _____				
_____ = Total Cover				
Sapling/Shrub Stratum (Plot size: _____)				
1. <u>HAU</u>	<u>90</u>			
2. <u>JAVA PLUM</u>	<u>5</u>			
3. <u>BAWANA (MUSA SP.)</u>	<u><1</u>			
4. _____				
5. _____				
_____ = Total Cover				
Herb Stratum (Plot size: _____)				
1. <u>BUFFALO GRASS (PACHLOA)</u>	<u>50</u>			
2. <u>LUDWIGIA OCTOVALUIS</u>	<u>10</u>			
3. <u>SAW GRASS (CLADIUM)</u>	<u>40</u>			
4. <u>PAMICERSE</u>				
5. _____				
6. _____				
7. _____				
8. _____				
_____ = Total Cover				
Woody/Vine Stratum (Plot size: _____)				
1. _____				
2. _____				
_____ = Total Cover				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____				
Remarks:				

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3								SATURATED F2 GLEYED MATRIX

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Muck Presence (A8) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Dark Surface (S7) <input checked="" type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8)	Indicators for Problematic Hydric Soils³: <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> Red Parent Material (F21) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks)
--	--	---

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input checked="" type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)	<input checked="" type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Tilapia Nests (B17) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa) <input type="checkbox"/> Other (Explain in Remarks)

Field Observations:

Surface Water Present? Yes No Depth (inches): 3"

Water Table Present? Yes No Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes No Depth (inches): 3"

Wetland Hydrology Present? Yes No

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

Remarks:
 ADVENTITIOUS ROOTS OBSERVED ON HAU SAPLING USED TO DETERMINE SEASONAL HIGH WATER WAS 8" ABOVE WETLAND BOTTOM.

Appendix B: Photo Document



Photo 1: Freshwater Emergent Wetland



Photo 2: Freshwater Forested Wetland



Photo 3: South of property



Photo 4: Hau dominant wetland



Photo 5: Adventitious roots



Photo6: Nail at upper extent of adventitious roots, showing seasonal high water



Photo 7: North of property



Photo 8: View along Hauula Homestead Road