MICHAEL P. VICTORINO
Mayor

DAVID C. THYNE
Fire Chief

BRADFORD K. VENTURA
Deputy Fire Chief

DEPARTMENT OF FIRE & PUBLIC SAFETY
FIRE PREVENTION BUREAU
COUNTY OF MAUI
313 MANEA PL.
WAILUKU, HI 96793

April 20, 2021

Paul T. Matsuda, P.E.
Group 70 International
111 S. King Street
Honolulu HI 96813

SUBJECT: **Kahana solar project**
TMK (2) 4-3-001:017
Response to G70 memorandum dated April 19 2021
Addressed to Fire Chief D.Thyne

Thank you for allowing our office to provide comment on the subject proposed project. As per your request, comments are provided below:

At this time and with the review of information provided in the subject memorandum we do not have any conflict with the proposed approach for this project to meet fire safety and protection compliance.

- Our office does reserve the right to comment on the proposed project during the building permit review process when detailed plans for this project are routed to our office for review. At that time, fire apparatus access, water supply for fire protection, and fire and life safety requirements associated with the subject project will be formally reviewed.

If there are any questions or comments, please feel free to contact me at (808) 876-4694 or by email at oliver.vaas@mauicounty.gov.

Sincerely,

Oliver Vaas
Lieutenant - Fire Prevention Bureau

111 S. King Street
Suite 170
Honolulu, HI 96813
808.523.5866
www.g70.design

MEMORANDUM

TO:	Department of Fire & Public Safety County of Maui 200 Dairy Road Kahului, Hawaii 96732		
ATTENTION:	Fire Chief David Thyne		
DATE:	April 19, 2021		
PROJECT:	Kahana Solar Project	**PROJECT NO:**	n/a
SUBJECT:	Kahana Solar Project – Maui Fire Code Compliance		
EMAIL/FAX:		**NO. OF PAGES:**	4

Purpose of Memorandum:

We are requesting review and confirmation of the proposed approach for the Project's compliance to the Maui County Fire Code as summarized in this memorandum. We have received the Department of Fire and Public Safety's (MFD) "Fire Protection considerations for Ground Mount Solar Array application," dated September 8, 2019. The Project's design will conform to the requirements outlined in that document.

Project and Developer Overview:

Kahana Solar LLC (Kahana Solar) is proposing to build and operate the Kahana Solar Project (Project) located in Napili-Honokowai on the Island of Maui. The Project will consist of a 20-megawatt (MWac) solar photovoltaic (PV) system coupled with a 20-MW, 4-hour (80 MWh) PV coupled battery energy storage system (PV-Coupled ESS) as well as ancillary support infrastructure located within an approximately 412-acre (167 hectares) Study Area, shown in Figure 1. The solar arrays and associated infrastructure would occupy approximately 220 acres situated on TMK 4-3-001:017.

The Project will connect into the Maui Electric grid via a new Maui Electric switchyard that would be constructed adjacent to the Project's substation on TMK 4-3-001:017. Maui Electric will connect their new switchyard to the existing transmission grid via a new 400-foot (or less) overhead 69-kV transmission line that would extend from the switchyard west to the current Maui Electric 69-kV overhead transmission line that runs north-south along the western boundary of TMK 4-3-001:084.

The Project Site access is from an existing agricultural access road at Akahele Street next to the intersection with Honoapiilani Highway. The road continues south parallel to Honoapiilani Highway, turning eastbound past Kapalua Airport, turning northbound for about 0.3 miles, before turning eastbound to the project area, as shown in Figure 1. The project area is approximately 1 mile east of Kapalua Airport. The path along the frontage road, around the Kapalua Airport, to the project area is approximately 1.4 miles. To the north of the Project site is Kapalua; to the south of the Project site is Kaanapali. Both are tourist destinations.

The Project's construction and commissioning timeline would require approximately 12 months, starting Q3 2022, and the solar project operations expect to begin by the end of 2023.

Ground Mount Solar Array Site Design:

In 2021, Maui County adopted the 2018 edition of NFPA 1 with Maui County Amendments, and the Project will comply with amended sections of the fire code as required. In addition, the specifically required information is outlined in the Department of Fire and Public Safety's "Fire Protection considerations for Ground Mount Solar Array application," dated September 8, 2019. The Project's approach to compliance is outlined below, and the required information will be included on the construction plans and in the required permit submittals for the Project.

1. Associated Energy Storage System; **The Battery Energy Storage System for the Project will be shown on the plans and comply with NFPA 855.**
2. Size of each array in square feet; **Areas of the solar arrays will be shown on the plans.**
3. The separation distance between arrays if multiple; **Separation distance between the arrays will be shown on the plans.**
4. Separation distance between array and closest structure; **Separation distance between the arrays and any structures will be shown on the plans.**
5. Type of ground or base material; **The array will be constructed on a dirt base which will be vegetated to prevent erosion.**
6. Maintenance plan to keep the area free of combustible growth; **A vegetation management plan will be prepared as required by the code.**
7. Security Barrier, fencing, or skirting to protect from electrical contact; **The array will be secured with gates and fencing which will be shown on the construction plans.**
8. Access to array including the width of Roadway and Gates; **The access roads will be approximately 20 feet wide, and lockboxes will be provided to allow site access through the perimeter fence.**

The table below contains requirements from NFPA 1 (2018 edition) and notes summarizing the Project's intended design approach.

NFPA 1 (2018 Edition) w/ Amendments		Notes
	Clearances	
11.12.3.1	A clear area of 10 ft (3048 mm) around ground-mounted photovoltaic installations shall be provided.	• Maui County Code has amended this section. Because the Project is greater than 3,000 sq ft per Maui County Amendments 16.04C.260 - Subsection 11.12.3.1.1 added. o Section 11.12 of the NFPA 1, as amended by the State Fire Code, is amended by adding a

NFPA 1 (2018 Edition) w/ Amendments		Notes
		new subsection to be designated subsection 11.12.3.1.1 to read as follows: 11.12.3.1.1 Ground-mounted photovoltaic systems larger than 3,000 square feet in area shall be provided with a clear of at least 30 feet in width or as approved by the AHJ.
11.12.3.1.1 (Maui County Amendment)	A clear area of at least 30 ft around ground-mounted photovoltaic system larger than 3,000 sq ft shall be provided with a clear of at least 30 feet in width or as approved by the AHJ.	• Maintenance requirements of the fire breaks will be established in a vegetation management plan (VMP). • The proposed fence will be located within the clear area with a minimum of 10' defensible width within the fence line and additional defensible width outside of the fence line. • Portions of the fire break outside of the fence line will be part of the solar project lease area, and the vegetation management plan will establish maintenance requirements for the firebreak on both sides of the fence. • A 50' minimum separation distance free of equipment will also be provided between each of the four (4) solar array blocks.
	Vegetation Management Plan	
11.12.3.2	A Vegetation Management Plan or noncombustible base acceptable to the AHJ shall be approved and maintained under and around the installation where required by the AHJ.	• A Vegetation and noncombustible base acceptable to the Authority Having Jurisdiction (AHJ) shall be approved and maintained under and around the installation. • Dirt is proposed as a non-combustible base. Vegetation is proposed over the dirt base to stabilize the ground and prevent erosion. A vegetation management plan will be prepared to establish preventive measures to minimize the risk of fire. • The following items are some of the preventive measures proposed in the VMP: o The vegetation will be maintained to a height of 18" and provide a minimum 24" clear distance between vegetation and exposed wire. o The vegetation will be maintained on both sides of the perimeter fence as needed to maintain the fire break. o Battery energy storage systems, including step-up transfers (ESS), will be surrounded by a 10' fire break to maintain a clear distance between vegetation and equipment.

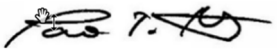
NFPA 1 (2018 Edition) w/ Amendments		Notes
		○ The substation fenced area will consist of gravel that maintains a clear distance between vegetation and equipment, including the Main Power Transformer.
	Security Barriers	
11.12.3.3	Fencing, skirting, or other suitable security barriers shall be installed when required by the AHJ.	• A 7'-high chain link fence will be provided around the perimeter of the solar Project.

Emergency Response:

Although not specifically required in the Maui Fire Code or the list of information required by MFD, Innergex will develop an Emergency Response Plan (ERP) with the appropriate agencies, including MFD. As part of the ERP, periodic training will be provided to MFD to inform first responders of the appropriate response to a fire at the Solar Project.

BESS units, compliant with NFPA 855, distributed throughout the Project, will store production energy until demanded by the utility company. In the event of a battery fire, equipment literature indicates the fire will be contained within the self-contained BESS unit and will not spread beyond the affected unit. In the event of a fire within the array, Innergex operators will remotely monitor, isolate and shut down portions of the solar array and associated infrastructure as appropriate to allow the fire to burn out. As such, the ERP will propose monitoring fires and allowing impacted infrastructure to burn out naturally.

VERY TRULY YOURS,



Paul T. Matsuda, P.E.
Group 70 International, Inc., dba G70

CC: File

KAHANA SOLAR PROJECT

VEGETATION MANAGEMENT PLAN

Effective Date: April 2021
Expiry Date:

Original signed by:

APPROVED BY:

Environment Manager

APPROVED BY:

Operations Manager

Revision History

Revised by	Revision Date	Summary of Revision
O.Robson	14-April-2021	Draft R1 version for review

Contents

1. OBJECTIVE

This operating Vegetation Management Plan describes the vegetation management program at the Kahana Solar Project.

The objective of the vegetation management program is to:

- Manage the site vegetation which can grow under and around the modules, fall on power lines and damage infrastructure.
- Establish and maintain fire and fuel breaks.
- Reduce the amount of vegetation to decrease wildfire hazards.
- Meet requirements established with the Maui Fire Department and NFPA 1 (2018) requirements.

2. PROCEDURE

2.1 Vegetation Survey

A physical vegetation survey assessment of the Kahana Solar Project, including generation transmission (gen-tie) right-of-way, will be completed at least twice a year to monitor for vegetation clearances and monitor for wildfire hazards. The survey will be conducted by the Site Operations Manager (SOM) and will follow guidance standards as indicated in Section 2.3.

The survey will be used to assess the frequency of upcoming vegetation maintenance and identify areas that may need additional attention and will be used to create a Vegetation Maintenance Work Plan. The work plan will be a living document that will be updated in order to meet the objectives of this document.

Observations will include:

- Location
- Species
- Estimated growth rate
- Abundance
- Clearance / Setbacks
- Risk of fire hazard

2.2 Vegetation Maintenance Work Plan

Kahana Solar will create and implement vegetation maintenance work plan based on the ground survey. The work plan shall include the method to be used for vegetation control and should be flexible to adjust to any changing site conditions as they arise. The work plan shall take into consideration the anticipated growth of vegetation, combustion risk, and all other environmental factors that may have an impact on the reliability of the Kahana Solar Project. Any adjustments to the work plan shall be documented as they occur. Kahana Solar will track the planned vegetation management work to ensure that it is completed according to the work specification.

Kahana Solar will also monitor the site vegetation on a monthly basis coinciding with each scheduled monthly maintenance cycle to ensure vegetation clearances and growth falls within the expected rates. Scheduled vegetation maintenance may be updated based on the observations.

Kahana Solar intends to generally subcontract the vegetation maintenance activities, however self-performance may be incorporated as required.

2.3 Vegetation Setbacks and Maintenance Requirements

Re-vegetation:

- Any un-stabilized areas within the arrays and fire breaks will be revegetated with grass species that are currently found throughout the site. A seed mix will be designed to assist with quick establishment to reduce dust and sediment and erosion issues while adding native species that do well in dry environments.

Fire Breaks:

- All fire breaks, defined as a gap in combustible materials or maintained vegetation below 6 inches in height or cut to the appropriate height as recommended following the vegetation survey.
- All fire breaks will be 30 feet around any array block as shown in grey in Figure 2 below. This fire break can include a 10-foot buffer on the outside of the fence line.
- Removal of all wood debris, slashing, trees and shrubs.
- Branches and limbs overhanging the fire break will be trimmed to 8 feet above the ground.
- Danger trees and dying growth outside the perimeter fence will be assessed to minimize fuel loading falling within the fire break.
- Site access roads, with an approximate 20-foot width, will provide additional fire breaks.
- Vegetation will be cleared to a maximum of 10 feet on the outside of the fence line as required to maintain the fire break.

Solar Arrays:

- Vegetation will be maintained to a height of 18-inches and provide a minimum of 24-inch clear distance to any exposed electrical cables. Exposed electrical wires should be running under the solar panels at the midpoint or higher than the center of the panel.
- A 50-foot separation distance free of equipment will be provided between array blocks.

DC Coupled Energy Storage System (DC-ESS) Units:

- Vegetation will be removed within 10-foot perimeter of the DC-ESS Units (combines battery energy storage and step-up transformer) pads. Gravel or similar noncombustible base shall be present.

Project Collector Substation:

- Vegetation will be removed from inside the project collector substation fence line. Gravel or similar noncombustible base shall be used.
- The Main Power Transformer will be located within the project collector substation and will have its own concrete containment base.

Generation-Transmission (gen-tie) line:

- Vegetation may not exceed 8-feet in height under the gen-tie line right-of-way.
- Danger trees will be removed.

Retention Basins:

- Keep retention areas free of emergent vegetation to avoid attracting listed waterbirds.
- Maintain vegetation along the perimeter of the retention areas as low as possible to discourage listed waterbirds from nesting.

2.4 Vegetation Control

The Vegetation Maintenance Work Plan will be followed during operation of the Project to ensure that vegetation does not grow in a manner that blocks or reduces solar radiation reaching the solar panels and reduce the risk of starting a fire. Vegetation control will employ Best Management Practices (BMPs) and techniques that are most appropriate for the local environment based on factors such as compatibility with grazing and existing land operations and preventing runoff – thus reducing the need to use chemical herbicides. BMPs may include physical vegetation control such as mowing and shredding or introduction of a non-invasive species that is low growing.

In rare circumstances where it is necessary to use herbicides, an effort will be made to minimize use and only apply bio-degradable, EPA-registered, organic solutions that are non-toxic to wildlife. Sustainable, long-term management practices and the promotion of healthy biodiversity within local ecosystems is a priority. Any herbicides used for vegetation management the site will be selected and used in a manner that fully complies with all applicable laws and regulations.

Although non-native weedy species are common in the Project Area, implement invasive species minimization measures to avoid the unintentional introduction or transport of new invasive species to the area. This includes utilizing on-site gravel, rock, and/or soil when practicable, purchasing raw materials (e.g., gravel, rock, soil) from a local supplier when practicable; utilizing certified, weed-free seed mixes; and washing and/or visually inspecting (as appropriate) construction materials or equipment arriving from outside Maui for excessive debris, plant materials, and invasive or harmful non-native species. Consult with Maui Invasive Species Committee (MISC) if needed. Personnel will follow the most recent Rapid ʻŌhiʻa Death decontamination protocols from USFWS and DOFAW as required.

Avoid trimming or removing woody vegetation (trees or shrubs) taller than 15 feet between June 1 and September 15, when juvenile bats are not yet capable of flying and may be roosting in the trees, resulting in the potential to be impacted. If some trimming or removing woody vegetation taller than 15 feet is necessary

between June 1 and September 15, consultation with USFWS and DOFAW is required to ensure impacts to the Hawaiian hoary bat are avoided.

Regularly monitor the Kahana Solar Project for tree tobacco, particularly after ground-disturbing activities, and remove all tree tobacco plants under 3 feet in height as soon as possible in accordance with USFWS recommendation measures to avoid and minimize potential project impacts to the endangered Blackburn's sphinx moth (USFWS 2020). If tree tobacco is over 3 feet in height, thoroughly search the plant for eggs, larvae, and signs of larval feeding and adhere to the USFWS treatment and removal process steps.

Mechanical means of vegetation control will include options as noted below.

- Mowing (preferred method, where terrain permits) using mower decks similar to the Van Wamel Series RF Rotary mower with swingarm capable of reaching under arrays and trimming around posts.
- Handheld brushing and line trimmers (limited access areas).
- Slashing (preferred method for low growing established plant community areas).
- Pruning (where a tree or higher growing vegetation is to be retained).
- Hazard tree removal

Grazing livestock on solar farms is becoming a popular method of weed abatement and controlling grass. Sheep can be effective and are already being utilized on other utility-scale projects in Hawaii and may be considered at the Kahana Solar Project, however it would not be considered the primary means.

2.5 Training

Each person will be provided a comprehensive Kahana Solar Project Orientation before commencing any work at site. The material at a minimum will cover topics such as a general overview of the project, hazard analysis, emergency response, archaeological and cultural, wildlife training and vegetation management (as outlined in this document).

The included wildlife education and observation program will help to identify state or federally-listed threatened, endangered, or otherwise rare plants or animals that may be found on-site (including Hawaiian hoary bat, seabirds, waterbirds, and Blackburn's sphinx moth) and to take appropriate steps if listed wildlife (including downed listed wildlife) are found, especially during vegetation management activities.

2.6 Contacts

If any questions or concerns arise with regards to the Vegetation Management Plan, the following personal may be contacted:

POSITION	NAME	EMAIL	PHONE
Kahana Solar Operations Manager	TBD	TBD	TBD
Innergex Environmental Manager	TBD	TBD	TBD

3 SITE LOCATIONS- COORDINATES

Site Coordinates: 20°57'12.34"N, 156°39'0.65"W

The main access route to the solar array area will enter from the south east corner of the intersection of Honoapiʻilani Highway and Akahele Street and would pass through TMK 4-3-001:082 (owned by Maui Ocean View LP) and 4-3-001:084 (owned by ML&P) to access TMK 4-3-001:017 (owned by ML&P). See Figure 1.

Figure 1: Location

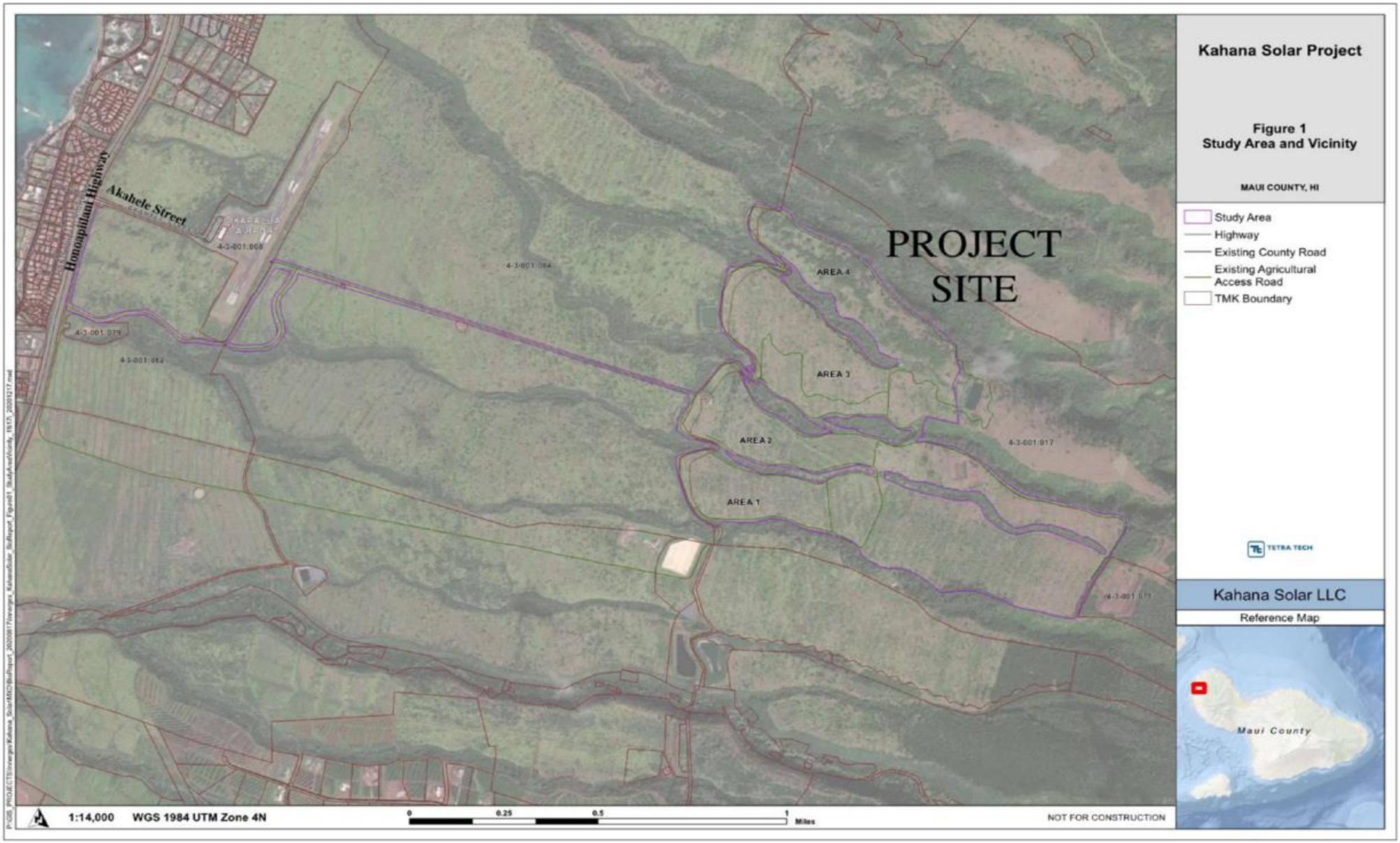


Figure 2: Fire Protection Clearance Map