

**STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
OFFICE OF CONSERVATION AND COASTAL LANDS  
HONOLULU, HAWAII**

*November 8, 2013*

**BOARD OF LAND AND  
NATURAL RESOURCES  
STATE OF HAWAII  
HONOLULU, HAWAII**

**REGARDING:** Conservation District Use Application (CDUA) OA-3677

**APPLICANT:** Ōhulehule Forest Conservancy, LLC c/o Paul Zweng

**AGENT:** Bruce Tsuchida, c/o Townscape, Inc.

**LOCATION:** Waikāne, Ko'olaupoko District, Island of O'ahu

**TMK:** (1) 4-8-006:001

**AREA OF PARCEL:** 327 acres

**AREA OF USE:** ~10 acres

**SUBZONE:** Resource

**DESCRIPTION OF AREA AND CURRENT USE:**

The subject parcel is located in Waikāne Valley on the windward coast of the Island of Oahu just north of the town of Kaneohe (**Exhibit 1**). The *mauka* (landward) portions of Waikāne Valley consist of steep, heavily-vegetated slopes which become more subdued in the *makai* (seaward) portions of the valley and the proposed project site. Below the mauka cliffs, a thin layer of weathered alluvium and rock overlays the Ko'olau basalt in the upper reaches of the valley. In the middle to lower reaches of the valley, and the location of the proposed project site, the layer of weathered alluvium becomes deeper and is overlain by younger alluvial sediments. These rich alluvial soils of Waikāne Valley are considered to be very fertile for agriculture and are included in the Agricultural Lands of Importance to the State of Hawai'i (ALISH). This designation concedes that these lands are 1) capable of sustaining high agricultural yields when managed properly, 2) able to contribute to the State's economic base and produce agricultural commodities, and 3) are needed to promote the expansion of agriculture activities and income for the future.

The Waikāne watershed is approximately 2.65 sq. miles in area and is drained by the perennial Waikāne Stream and its tributary the Waike'eke'e Stream, which empties into Kaneohe Bay. The flows within these streams were significantly modified by the construction of the Waiāhole Ditch, built between 1913 and 1916, to transport water resources to the various sugar plantations on the

leeward side of Oahu. A number of contested cases throughout the years regarding water rights of Waikāne finally ended in 2006 when the most recent decision and order was issued which allocated approximately 50% of the streams resources to the Waikāne Valley and the remainder to continue running through the Waiāhole Ditch system. As a result of this decision the Waikāne Stream is still a perennial stream, while the upper reaches of the Waike'eke'e Stream remain intermittent.

There is an existing Single Family Residence (SFR) on the subject parcel, with some minor agricultural and landscaping uses located throughout the proposed project area. A large fenced in area immediately adjacent to the SFR houses approximately 100-200 chickens that appear to be maintained by the current resident of the SFR along with some Ti and Banana plants (**Exhibit 2**); these uses were established prior to the establishment of the Conservation District on this parcel. There are some additional minor agricultural uses being conducted on the property in support of the Ōhulehule Forest Restoration project that is currently underway in the larger parcel *mauka* of the project area.

Land uses in the vicinity of the project area are dominated by small farms and rural neighborhoods in the *makai* portions of the valley and by large expanses of forested lands in *mauka* areas. The bulk of the parcels surrounding the project site are owned and managed by various federal, state, and local government agencies, although one large private landowner does reside nearby. To the south of the property in Waikāne Valley, about half of the Waiāhole ahupua'a is owned and managed as the Waiāhole Agricultural Park by the Hawai'i Housing Finance and Development Corporation (HHFDC).

### ***Floral and Faunal Resources***

The project area has average rainfall amounts of approximately 80 to 110 inches, which defines this area as a *mesic* forest system (i.e., type of habitat with a moderate or well-balanced supply of moisture). As a result of the moderate slopes and rainfall amounts the project area was primarily used for ranching and animal husbandry uses which resulted in significant disturbance to the native ecosystem and forest resources. A record from the Hawai'i Biodiversity Mapping Program (HBMP) database, the US Fish and Wildlife Service (USFWS) and the Bishop Museum indicate that no endangered plant species have been observed or recorded to occur within the project area. This lack of native floral species is thought to stem from the long history of land disturbance, including deforestation by ranching practices and past military uses. On March 24, 1994 the subject parcel was included into the State Land Use Conservation District. Up until that date the parcel was zoned under the SLU Agricultural District and included a number of existing, established uses such as the existing SFR and minor farming activities.

A report which presented the findings of a botanical survey of the project area was submitted as part of this review process. The survey concluded that large areas of the proposed project site are dominated by strawberry guava and albizia, which grows in thick stands. Areas not dominated by these invasive species are typically more open with sporadic tree species growing amongst non-native grasses, shrubs and herbs. Additional non-native tree species found at the project site include *Java plum*, *albizia*, *octopus tree*, *christmas apple*, *rose apple*, *koa haole*, *coconut*, *royal palm* and the *common Guava*. Additional Polynesian introduced and/or native plant species such as *ohi'a* and *hau* were observed at the site, although these species were limited and sparse.

According to the survey no rare plant species or species federally listed as endangered or threatened were observed within the project area.

A faunal survey of the project area was conducted to identify any bird, mammal, and other animal species present in the vicinity of the project area. According to the HBMP database and the USFWS, no endangered fauna has been previously recorded within the project area. Surveys for the Oahu Elepaio and other bird species were conducted throughout the project area and included pedestrian (i.e., walking) surveys and the use of electronic devices to broadcast “birdsong” for counting purposes. Surveys for the Hawaiian Hoary Bat were conducted using a bat detector which records ultrasonic echolocation calls; the bat detector was deployed for 6 nights to determine if any bats were present in the area. No Hawaiian Hoary Bat calls were recorded on any of the six nights the detector was deployed. A total of 17 bird species were observed in the project area although only one native species, the Kōlea or Pacific Golden Plover, was observed foraging on the grassy portions of the property. The other 16 bird species observed are considered to be non-native to the Hawaiian Islands.

### ***Culture, Architecture and Archeology***

In 1992 an archeological inventory survey that included subsurface testing, was completed in support of a proposed golf course project. The approximately 407-acre survey area, which includes the proposed project site, identified 13 sites (consisting of 100 component features) located within perennial or ephemeral stream drainage channels, and not within the proposed project area. Most of the features discovered were interpreted as pre-contact agricultural features; nine (9) were related to historic charcoal production, three (3) were related to temporary habitation; and one (1) was interpreted as a possible ceremonial site. Additional Archeological Inventory and Cultural Assessment Surveys have been previously completed in the area, although they do not cover the proposed project site.

Using this research a more recent “pedestrian” survey of the project site, with regards to cultural and archeological resources, was conducted in 2012 in preparation for this application and resource assessment. The pedestrian inspection consisted of a 100% ground survey of the project area using systematic sweeps by multiple archeologists. In general, surface visibility was fair to poor due to the dense vegetation that obscured the ground surface and the previous impacts from prior land alterations, illegal dumping and military uses throughout the region.

The report concluded that no historic properties or sites were identified within the project area from either the previous archeological investigations or during the recent pedestrian survey of the site. Additionally, it was determined that the project site was subjected to extensive land modifications associated with prior agricultural and military activities. The observed land disturbances have likely destroyed or covered any surface or sub-surface historic properties that may have been present at the project site. Based on these findings the applicant’s agent is seeking concurrence from the State Historic Preservation Division (SHPD) that a determination of “no historic properties affected” is warranted for the proposed project and no further archeological investigation will be required. Although it is unlikely that any historic resources would be uncovered during the construction phase of the proposed project, should any artifacts or human remains be uncovered, construction would immediately cease, and the State Historic Preservation Division (SHPD) would be contacted to evaluate the inadvertent discovery.

**PROPOSED USE:**

The overall goal of the 5 acre pilot cacao farm project is to eventually operate a profitable, organically based cacao farm using agroforestry principles with a secondary goal being the creation of a Waiāhole-Waikāne cacao appellation; similar to “Kona” coffee, the hope is to promote “Waikāne” cacao. As cacao is a relatively rare crop in the State of Hawai’i and there is very little local production experience it is important to test the proposed production method before expanding to full scale operation. This will provide the Ōhulehule Forest Conservancy an opportunity to recognize any potential issues that may arise with the development and implementation of a cacao farm, and create methods to rectify or correct issues early in the farm development process.

There are three main objectives of the proposed cacao farm which include creation of the farm, long-term production goals and land management. The proposed project is being cited as a “pilot project” in that the applicant is proposing a number of farming, soil management, shade and wind block creation techniques to establish a working cacao orchard in Waikāne. For ease of review the three (3) main objectives of the proposed project are outlined below:

**Objective 1: Establishment of a 5-acre Organic Cacao Orchard**

Cacao is considered to be an “understory” tree (grows best in partial shade) that is native to the tropical regions of the Americas. The fruit of a cacao tree is called a “pod” which typically contains 20-60 seeds, called cacao “beans” which are processed and used in the manufacture of chocolate. In order to establish a viable, organic cacao orchard a number of land and resource management activities are being proposed.

***Land Preparation:*** Land clearing and preparation of the soil using various soil amendments will be required to establish the planting area for the cacao orchard. Approximately three (3) of the five (5) acres of the proposed cacao orchard are located on land that will require extensive clearing of non-native vegetation such as the invasive strawberry guava and albizia. Land clearing activities will include the removal of small thickets using a small bulldozer. A portable chipper will be used to mulch the cleared vegetation which will then be stored and covered which will kill any remaining weed (non-native) seeds that remain in the mulch. The mulch produced from the clearing activities will be utilized for weed control throughout the cacao orchard. Large, invasive trees will be removed using a backhoe excavator to excavate the soil and remove the stump. Trees with diameters larger than 4 inches and/or trees that cannot be mulched will be used throughout the cacao orchard for slope stabilization and small scale erosion control.

After land clearing activities have been completed for the preparation of the cacao orchard the applicant will begin land preparation, establishment of an irrigation system and erosion control and weed suppression activities. Land development will start with soil “disking” which involves “slicing” the topmost layer of the soil as an efficient method of land preparation. Soil amendments will be added to prepare the area for planting. Typical soil amendments may include the application of lime to raise the soil pH to 5-7 and the application of organic fertilizers for additional soil amendments. Three (3) different erosion control and weed suppression methods will be utilized for the pilot project to determine the relative effectiveness on cacao growth, 1) ground cover cloth, 2) mulch from the clearing activities, and 3) vegetative conservation.

Vegetative conservation utilizes small cover vegetation (e.g., sun hemp and/or peanut) that is planted within and between the rows of cacao trees. A small “targeted” drip irrigation system will be constructed and placed along the tree rows with emitters located at the base of each tree to minimize the amount of water needed for irrigation.

***Planting Wind-block Trees and Orchard Development:*** Cacao trees are particularly sensitive to wind and must be protected from trade and other winds by establishing a perimeter of in-field wind-blocks prior to the planting of the cacao orchard. Wind blocks will also reduce soil erosion by providing additional soil stabilization and cover from heavy rain events. A variety of vegetative wind block species are being considered for this project, both short term and long term growth, as a relatively dense wind blocks are recommended at least during the establishment of the cacao seedlings. Some types of “temporary” wind blocks will be utilized such as *bana grass* and *hibiscus*. As the permanent wind block develops in height and density the temporary wind blocks will be removed to aid in the establishment of the orchard and to promote the more permanent wind block vegetation, koa. The Hawai'i Agricultural Research Corporation (HARC) has been conducting selective breeding of koa trees with a genetic resistance to “koa wilt” and has developed strains that have survival rates higher (at low elevations) than non-selected koa trees. These “low-elevation” koa trees are to be used as the dominant in-field shade tree for the new cacao farm. Planting of the wind blocks and shade trees will occur approximately 12 months in advance of the cacao seedling planting. The fast-growing, short-term shade and wind black plants should provide an adequate growing area to initiate the cacao seedlings. The establishment of the various windbreaks, shade trees and cages/tubes for the cacao seedlings will provide approximately 18 months before the cacao trees are completely exposed to the environment.

The farm is proposing to utilize contour planting to establish the Phase I portion of the orchard (**Exhibit 3, 3a, 3b, 3c**); planting trees approximately 8-foot apart with rows 12-feet in width between the trees. The resulting density will be approximately 400-425 cacao trees per acre for a total of ~2000-2625 trees being proposed for this 5-acre pilot project. The cacao saplings will be monitored daily to determine the health of the plants and for daily farm maintenance; this will allow the Ōhulehule Forest Conservancy to determine the best planting, mulching and fertilization methods for the proposed farm. Cacao trees generally require three (3) to five (5) years to mature in which weekly monitoring and maintenance will be necessary to establish the orchard. Additional sapling protection methods, such as fencing in the saplings, and weed control of the ground cover, are expected to foster early establishment of the orchard.

#### Objective 2: Facility buildings, Structures and Road Repair

Several farm structures, roadways and buildings will need to be constructed in order to conduct the daily maintenance and farming activities necessary to establish a working, productive cacao farm. Besides the roadway repair, and site preparation for the proposed cacao farm, three (3) main facilities are being proposed to be constructed in support of the farming activities, these include: 1) an office/baseyard, 2) a fermentation and drying facility, and 3) a plant nursery (**Exhibit 4**).

***Base-yard and office:*** The purpose of the 1<sup>st</sup> floor baseyard is to provide a secured storage facility for farming tools, farm vehicles, agricultural chemicals and amendments, and a work space for any required maintenance or repair of the farm equipment (**Exhibit 5**). The 2<sup>nd</sup> floor office area will be used for storage of records and documents, typical business uses and will provide an area

for on-site meetings (**Exhibit 6**). Additionally a small library and storage area and restrooms will be located on the second floor office area. The entire building (both 1<sup>st</sup> and 2<sup>nd</sup> floors) will be approximately 3200 sq. ft. in floor area and has been designed using best management practices (**Exhibit 7, 7a**), such as the placement of concrete floors to help manage any potential spills and the construction of separate storage areas for agricultural chemicals and farm equipment. The baseyard and office will have Hawaiian Electric Company (HECO) electrical service, water connections as well as a septic system for wastewater disposal.

**Covered outdoor work/meeting pavilion:** A small (955 sq. ft.) covered and ventilated wood constructed pavilion will be placed near the orchard areas to accommodate additional cacao processing and drying needs as well as providing an on-site meeting area for the farm (**Exhibit 8, 8a**).

**Cacao extraction, fermentation and drying buildings:** Two (2) separate buildings will be constructed as part of the cacao preparation after harvesting. Once harvested the cacao pods are cracked and allowed to ferment inside the pod. The applicant proposes to construct a 300 sq. ft. cacao preparation and fermentation facility to prepare and ferment the cacao pods (**Exhibit 9, 9a**). The fermentation structure will be a small building with double-wall construction to accommodate insulation for the retention of heat which aids in the cacao processing. The building will also have in place a collection system to capture the liquid that is created by the fermentation process (i.e., “sweatings”). The fermentation process may produce a few gallons of sweatings per day at full production; these sweatings can contain sugars, alcohol and acetic acid. Although considered non-toxic these sweatings are mildly corrosive and are likely to attract insects to the farm. To alleviate the potential impacts from the sweatings the collection system will be connected to a reservoir that will be regularly emptied into the properties septic system and permitted by the State Department of Health.

Once the cacao pods have been harvested, cracked and fermented in the fermentation building, the beans will be harvested and moved to the drying facility which includes a covered and ventilated area for the drying portion of the cacao processing. The drying facility building will be a 1250 sq. ft. “hoop house” covered in shade cloth that is similar to shade house/nursery buildings of similar design.

**Shade house/Plant nursery:** The applicant is proposing to construct an additional 2500 sq. ft. “hoop house” to grow the cacao seedlings and koa trees for orchard propagation (**Exhibit 10**). Additional uses of the shade house/plant nursery include the growth of native and rare plant species for the forest restoration that is underway mauka of the project site on a different parcel. The hoop house will be covered with 4mm ultraviolet-resistant plastic and shade cloth as needed. Gravel will be used as ground cover within the shade house/plant nursery to prevent weed growth. A gentle slope will be created within the shade house/plant nursery to allow water to drain away from the shade house to minimize the potential for algae, mold and/or fungus from accumulating and harming the new plantings. An overhead and/or drip irrigation system will be installed within the shade house/nursery; if needed a “fogger” will also be added to assist in the proper watering regime for each plant species. The shade house/plant nursery will be similar to those developed by the US Army and used by the Nature Conservancy (TNC) and the Lyon Arboretum for their respective nurseries.

**Access road repairs and construction:** There are several unimproved access roads through the project area, including several trails established by recreational off-road vehicles that trespass on the property. The presence of these unimproved access roads tends to increase soil erosion, soil loss, water ponding and poor drainage in gulch areas and throughout the subject parcel (**Exhibit 11**). As such a variety of existing trails will be improved and/or repaired to accommodate the proposed farm. Roads and trails not necessary for access throughout the project area will be abandoned and allowed to regrow with native vegetation. The numerous access roads and trails will be unpaved and will be between 8 to 12 feet wide at completion to accommodate light farm vehicles as cacao farming doesn't require large, heavy farm equipment to operate.

Depending on the location of the road repair the applicant has outlined two separate design principles to be implemented for road construction; both designs will utilize a backhoe excavator. For trails located along a side-hill an armored ditch will be created on the up-slope side of the roadway along with broad-based water diversion ditches to transfer water from the up-slope area to the down-slope area; here the road profile may be crowned or sloped into the hill. For road areas located on flat areas or bench sections, simple diversions and broad-based ditches will be constructed to control water flow from adjacent areas. For all road construction and repair activities the applicant will work to minimize soil disturbance and soil exposure by the installation of temporary erosion control blankets and seeding slopes with vegetation. Additional best management practices will include minimizing access roads on slopes >5%, identification of areas with concentrated drainage for potential special drainage features and structures, and road realignment to minimize environmental impacts.

### Objective 3: Long Term Farm Management and the Creation of the Waikāne Cacao Appellation

As part of the application process for this type of project, the applicant submitted for review the *Ōhulehule Forest Conservancy, LLC - Cacao Farm Management Plan* which outlines the goals of this pilot project and the management of the daily activities on the proposed cacao farm. While this plan outlines a number of potential management issues, this office recognizes three (3) main management activities that warrant intensive review; pest control, nutrient management, and water management.

**Pest control:** With the exception of the Chinese Rose Beetle, Hawai'i has none of the typical insect pest that can damage cacao orchards like other areas of the world. For Hawai'i the Chinese Rose Beetle are of main concern during the period of early tree establishment where the insect can cause considerable damage, including the possible death of the juvenile cacao trees during the first few years of growth. Once trees become established, however, the Rose Beetle becomes less of a problem and requires fewer pesticides for control. Depending on the severity and extent of any Chinese Rose Beetle infestation the applicant will apply a registered insecticide to prevent tree loss.

At the present time there is only one type of insecticide that is registered for cacao, azadirachtin formulations, although according to a local (University of Hawai'i) pesticide specialist, this type of pesticide is unlikely to be effective in controlling the Rose Beetle. In preparation for the pilot cacao farm the applicant, along with University of Hawaii researchers, is working with the US Environmental Protection Agency (EPA) to obtain a Special Local Needs (SLN) permit for another chemical, imidacloprid, which is substantially more effective than azadirachtin at

controlling Rose Beetle infestation. The impacts to the environment are minimized by the use of imidacloprid as well as being less of a safety hazard for workers as it requires less application and less chemical to achieve the desired effects. Because the impacts of the Rose Beetle become less severe in the second and third year of the cacao tree establishment, the applicant states that imidacloprid will no longer be needed by the time trees reach fruit bearing age.

**Nutrient management:** The growth of cacao requires optimal soil conditions which include specific levels of pH, Nitrogen (NO<sub>3</sub>, NH<sub>4</sub>), Phosphorous, Potassium (K), Calcium and Magnesium, along with organic Carbon to maintain an effective orchard. Soil testing will be conducted prior to tree establishment and then on an annual basis to ensure proper soil conditions are maintained. Common soil amendments that could be necessary on the farm may include the additions of lime, magnesium sulfate, phosphate manure, compost and mulch from the clearing activities. The timing and application procedures will depend on the soil conditions, location and availability of the soil amendments. While total soil amendment requirements will increase as the trees mature (i.e., nutrients are immobilized in the cacao pods requiring new inputs) the retention of leaf litter and the return of the fruit husks to the field will recycle substantial nutrients to the soil, particularly potassium, and reduce the total soil amendment requirements over time.

Soil nutrient deficiencies and high levels of exposure to wind and sun in portions of the cacao farm pose a significant challenge to the initial establishment of the cacao seedlings, although these issues will be addressed in part with organic soil amendments, land preparation and ongoing farm management. Additionally, as part of this pilot project, the applicant will plant a trial patch of cacao seedlings using *inorganic* fertilizers to compare the health and vigor of the plants to those grown using organic means. Once the plants have been established after 2-3 years the applicant plans on operating an entirely organic cacao farm.

**Water management:** During the establishment of the cacao trees, irrigation may be required during extended dry periods, although the use of micro-irrigation will allow for "targeted" watering minimizing the use of local water resources. During dry periods irrigation will be conducted two to three (2-3) times per week at a rate not to exceed 2000 gallons per acre per week. A water tank, approximately 20-feet in diameter, may be installed in the orchard area to store agricultural water for the farm and nursery irrigation systems.

Once a closed canopy of shade and wind trees is developed and the cacao trees have matured moisture loss from soil should be reduced, thus reducing irrigation needs of the farm. It is anticipated that irrigation may only be required during the initial stages of farm development and during any prolonged dry season after the orchard has been established.

#### **SUMMARY OF COMMENTS:**

The Office of Conservation and Coastal Lands (OCCL) referred the application to the following state agencies for review and comment: DLNR - Division of Forestry and Wildlife (DOFAW), Historic Preservation Division (SHPD), Division of Aquatic Resources (DAR), O'ahu Land Division (ODLO), the Hawaii State Department of Health, the Hawaii State Department of Agriculture, the Office of Hawaiian Affairs, the Commission on Water Resources Management (CWRM), and the City and County of Honolulu - Department of Planning and Permitting. The

application was also provided to the Kaneohe State Library and to the Kahalu'u Neighborhood Board (#29).

*Comments received from the following agencies have been summarized by staff as follows:*

DLNR – O'ahu District Land Office (ODLO)

No comments on the proposed project.

DLNR – Division of Forestry and Wildlife

DOFAW has reviewed the Draft Environmental Assessment for the proposed Ōhulehule Forest Conservancy Commercial Cacao Agroforestry Pilot Farm and Facility and agrees with the Finding of No Significant Impact (FONSI). The Forest Stewardship Advisory Committee has previously reviewed and approved the forest management plan for this property at their meeting on *May 11, 2013*. DOFAW is supportive of agroforestry models such as the proposed project for their beneficial impacts to the environment including increased biodiversity, reduced soil loss and erosion, improved soil and water quality and creation of wildlife habitat. Best Management Practices regarding the uses of pesticides and fertilizers throughout the life of the farm should be maintained with significant focus on the nearby streams.

The Hawai'i Pacific Weed Risk Assessment (WRA) is a resource that can be used to determine the potential of plant species to exhibit invasive pest tendencies. Usage of the WRA scoring is recommended for non-native, hardwood species selection for the proposed project. Species that rank as high risk, under the WRA, should be further evaluated before being incorporated into the farm.

*Applicant Response:*

- *Per your suggestion, the Ōhulehule Forest Conservancy will use the Hawai'i Pacific Weed Risk Assessment (WRA) to evaluate any non-native, hardwood species that may be considered for the project.*
- *Regarding the utilization of pesticides and fertilizers, the Ōhulehule Forest Conservancy will avoid application of these materials during rain events, and will take care to prevent any contamination of Waikāne and/or Waike'eke'e Streams. Once the cacao trees have been established and are productive, only organic fertilizers will be used.*

Hawaii State Department of Health

No comments on the proposed project.

Comments from Public Hearing

Two significant comments were received during the public hearing that deserve attention. A local, private citizen, who is support of the proposed project, believes that the applicant's proposal is in-line with the future of Waikāne Valley and hopes that the applicants experience and knowledge gained during this pilot project can be transferred to other farmers in the area. A second private citizen, who is a local culinary arts student here in Hawaii, expressed enthusiasm and support for the projects as she felt the production of "Hawaii-centric" foods like the proposed "Waikāne Cacao" could help promote Hawaii better and allow local eateries and restaurants to purchase more local goods. She believed that promoting diversified agriculture is good for Hawaii's culinary future.

Kahalu'u Neighborhood Board #29

On June 13, 2012 the Kahalu'u Neighborhood Board #29 unanimously adopted the following resolution which supports (3) *the operation of an agroforestry cacao farm.*

Waiāhole-Waikāne Community Association

In a letter dated June 5, 2012 the WWCA Steering Committee documented support for the applicants various projects on the Waikāne Valley property, including (3) *the operation of an agroforestry cacao farm.*

**ANALYSIS:**

Following review and acceptance for processing, the Applicant's Agent was notified, by letter dated *June 5, 2013* that:

1. The proposal to establish a commercial cacao farm on the subject parcel is an identified land use within the Conservation District General Subzone pursuant to Hawaii Administrative Rules (HAR) §13-5-23, L-1 AGRICULTURE (D-1), *Agriculture, within an area of more than one acre, defined as the planting, cultivating, and harvesting of horticultural crops, floricultural crops, or forest products, or animal husbandry. A management plan approved simultaneously with the permit is also required.* This action will require the applicant complete a Conservation District Use Application (CDUA) and all required documentation for a Board Permit;
2. In conformance with §343, Hawaii Revised Statutes (HRS), as amended, and HAR, §11-200-8 **this project will require the filing of an Environmental Assessment (EA).** In conformance with Chapter 343, HRS, as amended, and Chapter 11-200, HAR, a finding of no significant impact to the environment (AFONSI) is anticipated for the proposed project.; and
3. Pursuant to HAR §13-5-40 Hearings, (a) *Public hearings shall be held: (1) On all applications for a proposed use of land for commercial purposes.* Therefore **this project will require a public hearing.**

A public hearing was held for the proposed project on *September 10, 2013* at the Key Project Community Center, Kane'ohe, HI; notification for the Public Hearing was published in the Honolulu Star Advertiser on *August 19, 2013*.

A notice of a Finding of No Significant Impact (FONSI) for the Ōhulehule Forest Conservancy Cacao Farm Project Final Environmental Assessment (FEA) was published in the *October 8, 2013* issue of Office of Environmental Quality Control (OEQC) document the Environmental Notice.

**§13-5-30 CRITERIA:**

The following discussion evaluates the merits of the proposed land use by applying the criteria established in HAR §13-5-30.

- 1) *The proposed use is consistent with the purpose of the Conservation District.*

The objective of the Conservation District is to conserve, protect, and preserve the important natural resources' of the state through appropriate management and use to promote their long-term sustainability and the public health, safety and welfare.

The proposed cacao farm is an appropriate and sustainable land use for the management and protection of the natural resources of Waikāne Valley and is consistent with the agricultural plans and goals of the residents in this area. Although cacao is not a native Hawaiian plant, it has been shown to have a low invasive potential and can be an economically viable crop while koa and other native plants will be utilized for shade and wind protection. The Ōhulehule Forest Conservancy plans to provide controlled public access to the property, which will allow for continued recreation and gathering practices while improving safety of visitors and minimizing the damage to the environmental conditions of the land. One of the goals of this proposed cacao farm is to encourage community participation in resource management activities and the sharing of information concerning agroforestry and cultural practices; this project may be able to provide "standards" for the farming and cultivation of cacao in Hawai'i.

The use of local water resources will be minimized by the implementation of micro-irrigation and "targeted" irrigation to conserve as much of the water resources as possible. Once the agroforestry portion of the proposed project is established, including the windbreak, shade trees and cacao orchard, the vegetative cover should reduce soil erosion and runoff which should improve surface water quality in the nearby streams. Additionally as the orchard and farm mature, supplemental irrigation should only be required during heavy drought periods.

- 2) *The proposed land use is consistent with the objectives of the Subzone of the land on which the use will occur.*

The objective of the Resource Subzone is to *ensure, with proper management, the sustainable use of the natural resources of those areas.* The proposed use is an identified land use in the Resource Subzone of the Conservation District pursuant to HAR §13-5-23, L-1 **AGRICULTURE (D-1)**, *Agriculture, within an area of more than one acre, defined as the planting, cultivating, and harvesting of horticultural crops, floricultural crops, or forest products, or animal husbandry. A management plan approved simultaneously with the permit is also required.*

The proposed land use will help to sustain the limited native habitats of Waikāne Valley by controlling the spread of invasive species and establishing an agroforestry farm that utilizes koa as the predominant in-field shade tree. The design of this proposed agroforestry cacao farm will ensure that sustainable principles are promoted and the use of environmentally unfriendly chemicals and fertilizers will be reduced. Additionally the Ōhulehule Forest Conservancy will seek community involvement in ungulate control, invasive species control and other activities that provide educational and practical information for any interested parties or individuals.

- 3) *The proposed land use complies with the provisions and guidelines contained in Chapter 205A, HRS entitled "Coastal Zone Management", where applicable.*

The CZM program is intended to promote the protection and maintenance of fragile coastal resources through the state of Hawaii. While the proposed project site is located approximately 1-mile from the nearest shoreline, staff believes every land use project has the potential to affect coastal resources in an island ecosystem.

*Historic and Cultural Resources:*

As no historic sites were identified within the project area the cacao farm activities are not anticipated to impact customary and native Hawaiian rights. Any native Hawaiians with gathering or cultural needs will be provided walking access to the valley. Although some ungulate proof fencing may be constructed, gates will be strategically placed at location of existing trails (in good order).

*Scenic and Open Space Resources:*

The subject parcel is overgrown with thick stands of a number of invasive trees, such as strawberry guava and albizia; these invasive species will be removed as part of this proposed project. As there are significant scenic resources of the coast from the subject parcel, staff believes that the removal of invasive trees will improve the open space character of the area.

*Coastal Resources:*

The removal of aggressive invasive plants and animals, along with the controlled access to the property minimizing "off road" activity, is expected to improve the health of coastal ecosystems by reducing the sediment runoff to Waikāne Stream. Additionally, soil loss and erosion will be better controlled by the farm access road design and the numerous Best Management Practices (BMP) such as: road crowning, broad-based diversion channels and vegetative ground cover being employed for this project.

*Economic Uses:*

While the agroforestry project will provide a limited number of jobs to the region, both seasonal and permanent, the future economic potential is high. If the viability of cacao production in Waikāne Valley is determined to be positive the Ōhulehule Forest Conservancy hopes to encourage other local farmers to produce high-quality, organically-grown cacao to create the conditions necessary for a regional appellation which could command premium prices for Waiāhole-Waikāne cacao.

*Managing Development and Public Participation:*

In order to ensure that the goals of the proposed cacao farm project are aligned with other local conservation entities and programs the Ōhulehule Forest Conservancy has sought advice from a number of local, state and federal agencies and organizations. The Ōhulehule Forest Conservancy has become a member of the Ko'olau Mountains Watershed Partnership and the Waiāhole-Waikāne Community Association to keep the local community involved in the process of creating a cacao farm. Additionally the Ōhulehule Forest Conservancy will seek volunteer help for a number of activities at the project site. Besides offering educational opportunities for interested parties it is hoped that that these volunteer and community based outreach programs will foster awareness of issues and opportunities associated with agroforestry in Waikāne Valley.

*Beach Protection and Marine Resources:*

The property is not within the Special Management Area (SMA), and therefore the City and County of Honolulu, Department of Planning and Permitting has determined that the proposed project will not require an SMA permit. OCCL believes that the project is consistent with the guidelines and objectives contained in HRS §205A. As the proposed project has been designed to reduce run-off and minimize soil erosion, both considered potential risks to the coastal zone, it is not expected to have any adverse impact on the shoreline ecosystems.

- 4) *The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region.*

Potential impacts on water quality will be primarily limited to the early establishment of the project site and orchards and may include water contamination by soil erosion during the construction of roads, building and land clearing activities. These construction activities will be conducted outside of the wet season (i.e., December to March) and during clement weather to minimize the potential impacts from soil erosion. A number of land based erosion control techniques will be employed to minimize the effects during construction such as the use of ground-cover cloths, vegetative ground cover crops and mulching. Staff believes that the proposed cacao farm project will contribute to the increased health of the rest of the watershed by the removal of invasive plant species and the establishment of the agroforestry system that promotes water retention in the soil.

While the use of herbicides is proposed for the land preparation portion of the project the Ōhulehule Forest Conservancy will ensure that these activities do not impact nearby stream resources by utilizing herbicides that have a low toxicity to fish in areas that have the potential to run-off into the riverine system.

- 5) *The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.*

Land uses in the vicinity of the property are dominated by small farms and rural neighborhoods in the makai portions of the valleys, and by large expanses of forested lands in mauka areas. As the bulk of the lands that surround the subject parcel and project area are owned and managed by various local, state and federal agencies, including the US Army, staff believes that this proposed project is appropriate to the surrounding uses and is more consistent with regional and community-level planning efforts. To this end the Ōhulehule Forest Conservancy has aligned the project with a number of “key elements” that are outlined in the Ko’olaupoko Sustainable Communities Plan (SCP) developed in 2000. Of the 10 main goals outlined in the Ko’olaupoko SCP, the proposed project supports four of those elements:

1. *Adapt the concept of ahupua’a as a basis for land use and natural resource management;*
2. *Preserve and promote open space throughout the region;*
3. *Preserve and promote agricultural uses; and*

4. *Preserve and enhance scenic, recreational, and cultural features that define Ko'olaupoko sense of place.*

- 6) *The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable.*

The proposed cacao farm and facilities will be sited to minimize their visual impact from Waiāhole Valley Road and other areas of the property. Views of the ocean and mountains may be partially obstructed by windbreaks, shade trees and the cacao orchard although these uses align with the rural, agricultural character of Waikāne Valley. As the initial stages of the proposed project include the removal of invasive vegetation staff believes the project will improve the open space characteristics of the land and “clean-up” the existing viewplanes to and from the project area.

- 7) *Subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District.*

The proposed project does not involve subdivision of Conservation District land.

- 8) *The proposed land use will not be materially detrimental to the public health, safety and welfare.*

By regulating access to the subject parcel and project area the Ōhulehule Forest Conservancy aims to reduce unauthorized access which may negatively impact the environment while improving the safety and security of site visitors and workers. Additionally the Ōhulehule Forest Conservancy is seeking a partnership with local pig hunters to assist in the management of the feral pig population. Hunters will be granted access to the property after meeting safety requirements outlined by the landowner. Access for those individuals with native or cultural gathering rights in the area of Waikāne Valley will be provided by the landowner under controlled conditions similar to the pig hunters. This controlled access will aim to eliminate the unauthorized and unsafe activities on the subject parcel while allowing an avenue for legitimate practitioners to visit and walk the subject parcel. Staff believes that a working farm, located on this property, will promote the public health, safety and welfare of those residents in the vicinity of the proposed project site.

#### **DISCUSSION:**

The purpose of the proposed Ōhulehule Forest Conservancy 5-Acre Pilot Cacao Farm project is to determine the best environmental conditions and site characteristics necessary to establish and promote a viable, commercial cacao farm using agroforestry principles for the creation of the “Waiāhole-Waikāne Cacao Appellation”.

Prior to 1994 the subject parcel was designated within the State Land Use (SLU) Agricultural District and included some existing minor agricultural uses, structures, and land use activities on the parcel. In 1994 the SLU District designation was amended and the subject parcel was re-designated to the SLU Conservation District; at that time the proposed plan for the parcel was the

construction and operation of a commercial golf course. As the rules regarding the Conservation District (Hawaii Administrative Rules Ch. 13-5) do not recognize a “golf course” as an identified land use, the proposed golf course project was abandoned and the land remained overgrown, unmanaged, and partially vacant until the current landowner purchased the property.

The project area is dominated by large stands of strawberry guava and albizia, both of which are considered major invasive species in Hawaii. The initial stages of the proposed project include land preparation and invasive species removal. Land clearing activities in preparation for the development of the farm and orchard will produce immediate positive results and provide the area necessary to create a viable cacao farm. Road and trail repair and construction will aid in the elimination of soil erosion and soil loss that occurs around the project site while providing safe access for all visitors and workers throughout the subject parcel.

There are a few unique situations where commercial farming (i.e., aquaculture, silviculture and agriculture) have been permitted and/or authorized within the Conservation District and only when the proposed activities are compatible with the surrounding land uses. In this instance farming is the principal land use in this region, with residential development secondary to agricultural activities. Staff believes that the proposed farming practices may improve the natural character of the land, and provide an impetus for low-impact sustainable uses which is the objective of the Conservation District Resource Subzone. As this parcel has been previously disturbed by a number of prior land uses, unauthorized access and unmanaged agriculture the proposed project will improve the existing character of the land and promote positive agricultural uses which are predominant in Waikāne Valley.

If this proposed 5-acre pilot cacao farm is determined to be viable and economically feasible, the applicant plans on expanding the operations to a larger (i.e., 50 acres) cacao farm. Since the various methods and practices in regards to cacao farming are not well known for the State of Hawaii, the applicant’s goal is to determine the best way to manage the land and grow cacao for commercial purposes. Additionally, the construction of the processing facility on-site will allow for a more comprehensive determination of farm viability, and provide the Ōhulehule Forest Conservancy the necessary means to distribute cacao and promote the “Waiāhole-Waikāne Cacao Appellation”.

The applicant will be required to implement standard construction BMPs to reduce potential impacts during the construction and development phases of the various farm facility buildings and orchard. Construction activities will comply with applicable federal, State and County regulations and standards, and noise and air quality potential impacts will be mitigated through compliance with the Department of Health regulations. The applicant will implement long-term BMPs through the execution of the management plan to ensure that farming activities do not incur negative effects on the local environment.

In the unlikely event subsurface prehistoric deposits or human burials are inadvertently discovered during construction or land uses activities, such activities would be immediately suspended in the vicinity of the discovery and SHPD would be notified. OCCL has concluded that the applicant meets the Conservation Criteria outlined in Hawai’i Administrative Rules (HAR) §13-5 and after careful review of the application, OCCL recommends that the Chair approve this proposal.

**RECOMMENDATION:**

Based on the preceding analysis, Staff recommends that the Board of Land and Natural Resources **APPROVE** this application, including the management plan, for a 5-acre pilot cacao farm located in Waikāne Valley, Ko'olaupoko District, Island of O'ahu, on Tax Map Key: (1) 4-8-006:001, subject to the following conditions:

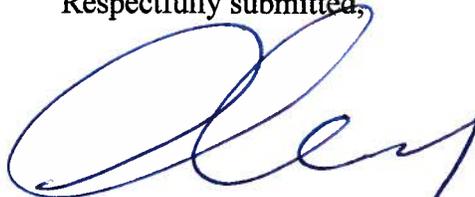
1. The permittee shall comply with all applicable statutes, ordinances, rules, and regulations of the federal, state, and county governments, and applicable parts of this chapter;
2. The permittee, its successors and assigns, shall indemnify and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, and death arising out of any act or omission of the applicant, its successors, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit;
3. The permittee shall obtain appropriate authorization from the department for the occupancy of state lands, if applicable;
4. The permittee shall comply with all applicable department of health administrative rules, and the applicable parts of HAR §13-5-42;
5. Before proceeding with any work authorized by the department or the board, the permittee shall submit four copies of the construction plans and specifications for the various farm facility buildings to the chairperson or an authorized representative for approval for consistency with the conditions of the permit and the declarations set forth in the permit application. Three of the copies will be returned to the permittee. Plan approval by the chairperson does not constitute approval required from other agencies;
6. Unless otherwise authorized, any work or construction to be done on the land shall be initiated within one (1) year of the approval of such use, in accordance with construction plans that have been signed by the chairperson, and shall be completed within six (5) years of the approval of such use. The permittee shall notify the department in writing when construction activity is initiated and when it is completed;
7. All representations relative to mitigation set forth in the accepted environmental assessment and management plan for the proposed use are incorporated as conditions of the permit;
8. The permittee understands and agrees that the permit does not convey any vested right(s) or exclusive privilege;
9. In issuing the permit, the department and board have relied on the information and data that the permittee has provided in connection with the permit application. If, subsequent to the issuance of the permit such information and data prove to be false, incomplete, or inaccurate, this permit may be modified, suspended, or revoked, in whole or in part, and the department may, in addition, institute appropriate legal proceedings;

10. When provided or required, potable water supply and sanitation facilities shall have the approval of the department of health and the county department of water supply;
11. Provisions for access, parking, drainage, fire protection, safety, signs, lighting, and changes on the landscape shall be provided;
12. Where any interference, nuisance, or harm may be caused, or hazard established by the use, the permittee shall be required to take measures to minimize or eliminate the interference, nuisance, harm, or hazard;
13. Obstruction of public roads, trails, lateral shoreline access, and pathways shall be avoided or minimized. If obstruction is unavoidable, the permittee shall provide alternative roads, trails, lateral beach access, or pathways acceptable to the department;
14. Except in case of public highways, access roads shall be limited to a maximum of two lanes;
15. During construction, appropriate mitigation measures shall be implemented to minimize impacts to off-site roadways, utilities, and public facilities;
16. Cleared areas shall be revegetated, in accordance with landscaping guidelines provided in this chapter, within thirty days unless otherwise provided for in a plan on file with and approved by the department;
17. Use of the area shall conform to the program of an appropriate soil and water conservation district or plan approved by and on file with the department, where applicable;
18. Specific Best Management Practices (BMP) outlined in the accepted Management Plan and throughout this staff report shall be utilized during all phases of the proposed project;
19. The permittee will submit a management report after the initial three (3) years of the project and prior to applying for additional land uses on the property;
20. The permittee shall obtain a county building or grading permit or both for the use prior to final construction plan approval by the department;
21. For all landscaped areas, landscaping and irrigation shall be contained and maintained within the property, and shall under no circumstances extend seaward of the shoreline as defined in section 205A-1, HRS;
22. Artificial light from exterior lighting fixtures, including but not limited to floodlights, uplights, or spotlights used for decorative or aesthetic purposes, shall be prohibited if the light directly illuminates or is directed to project across property boundaries toward the shoreline and ocean waters, except as may be permitted pursuant to section 205A-71, HRS . All exterior lighting shall be shielded to protect the night sky;
23. The permittee acknowledges that the approved work shall not hamper, impede, or otherwise limit the exercise of traditional, customary, or religious practices of native Hawaiians in the

immediate area, to the extent the practices are provided for by the Constitution of the State of Hawaii, and by Hawaii statutory and case law;

24. Other terms and conditions as prescribed by the chairperson;
25. Failure to comply with any of these conditions shall render a permit void under the chapter, as determined by the chairperson or board.

Respectfully submitted,



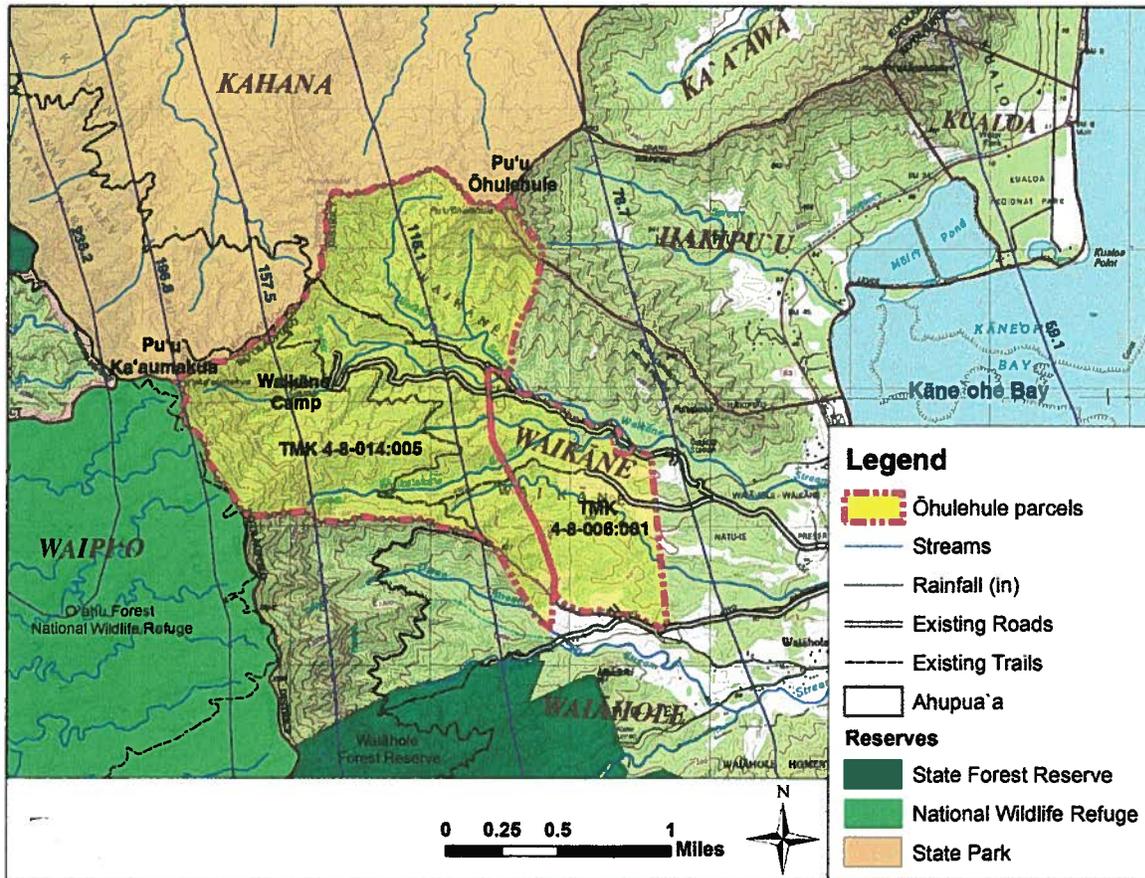
Alex J. Roy, M.Sc., Staff Planner  
*Office of Conservation and Coastal Lands*

Approved for submittal:



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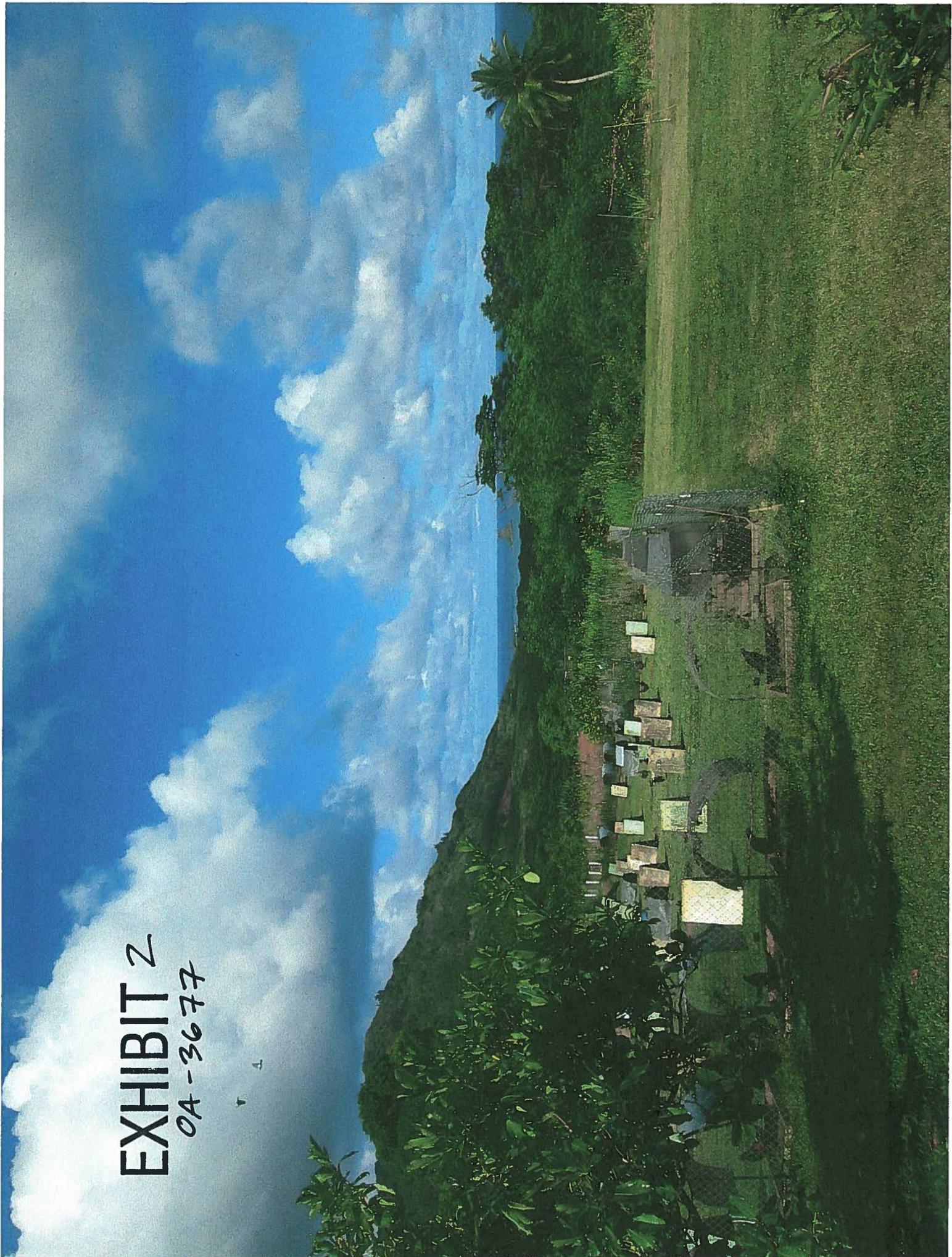
William J. Aila, Jr., Chairperson  
*Board of Land and Natural Resources*

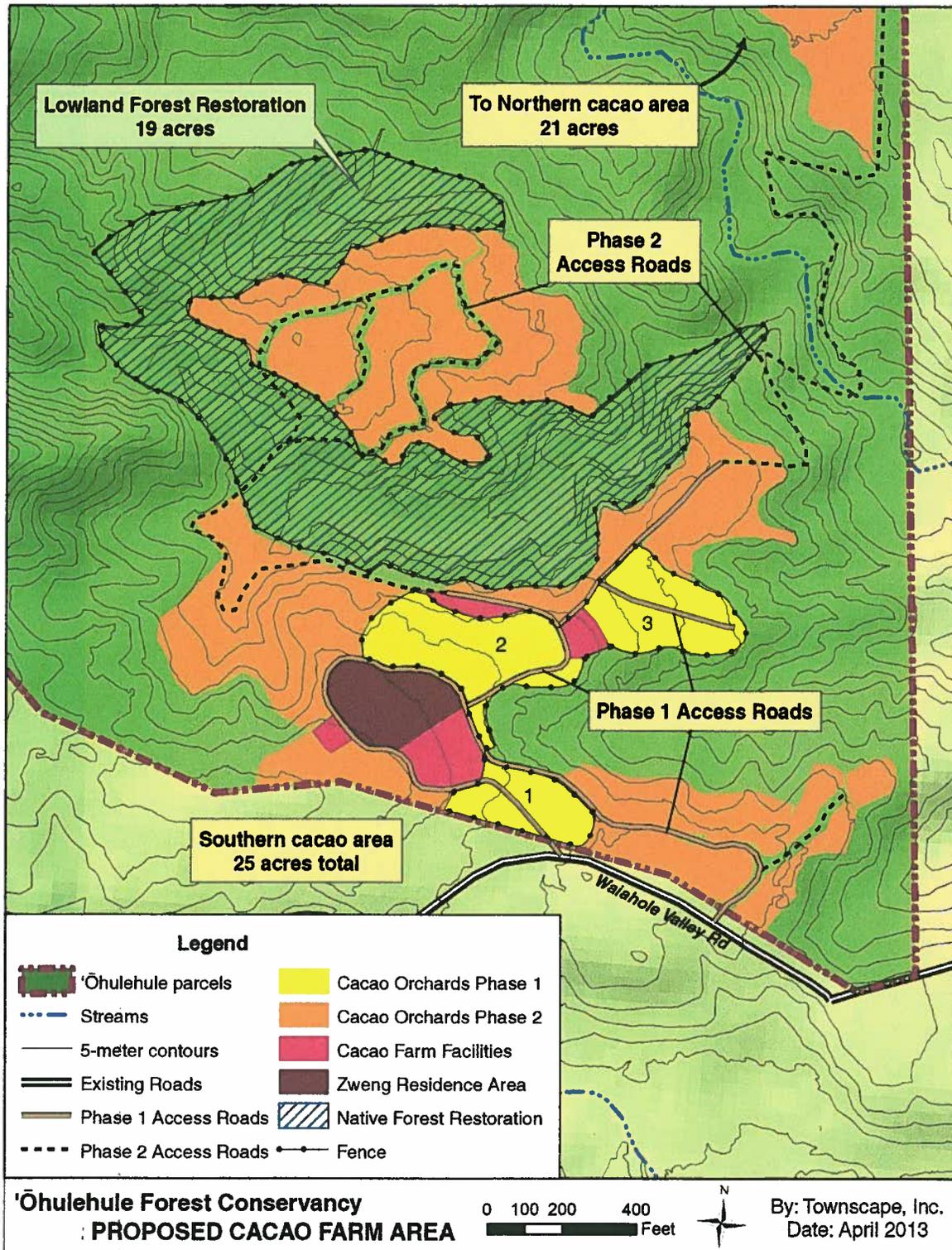


# EXHIBIT 1

OA-3677

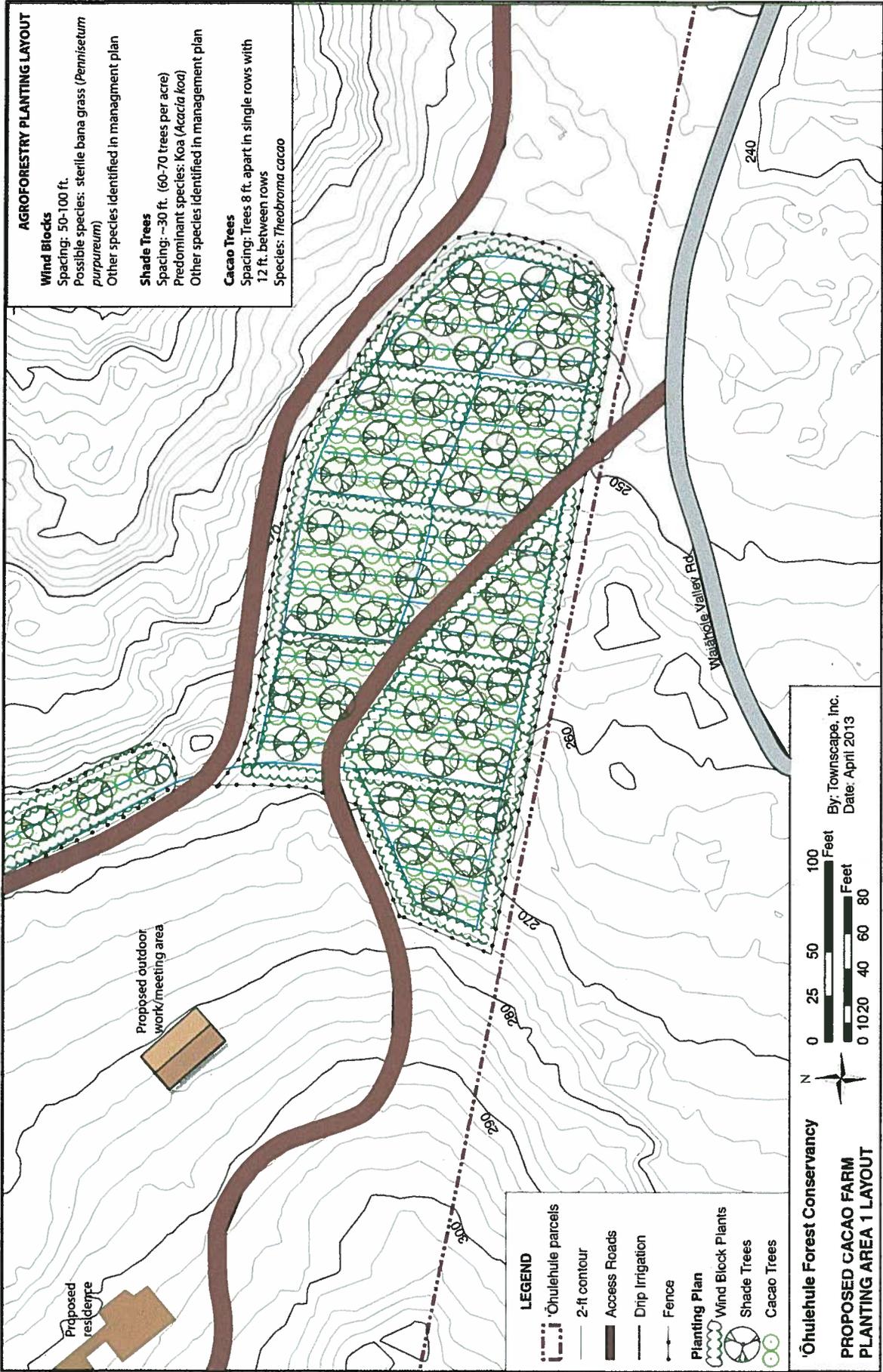
EXHIBIT 2  
0A-3677





# EXHIBIT 3

0A-3677



**AGROFORESTRY PLANTING LAYOUT**

**Wind Blocks**  
 Spacing: 50-100 ft.  
 Possible species: sterile bana grass (*Pennisetum purpureum*)  
 Other species identified in management plan

**Shade Trees**  
 Spacing: ~30 ft. (60-70 trees per acre)  
 Predominant species: Koa (*Acacia koa*)  
 Other species identified in management plan

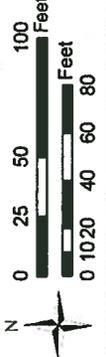
**Cacao Trees**  
 Spacing: Trees 8 ft. apart in single rows with 12 ft. between rows  
 Species: *Theobroma cacao*

**LEGEND**

- Ōhulehule parcels
- 2-ft contour
- Access Roads
- Drip Irrigation
- Fence
- Planting Plan**
- Wind Block Plants
- Shade Trees
- Cacao Trees

Ōhulehule Forest Conservancy  
 PROPOSED CACAO FARM  
 PLANTING AREA 1 LAYOUT

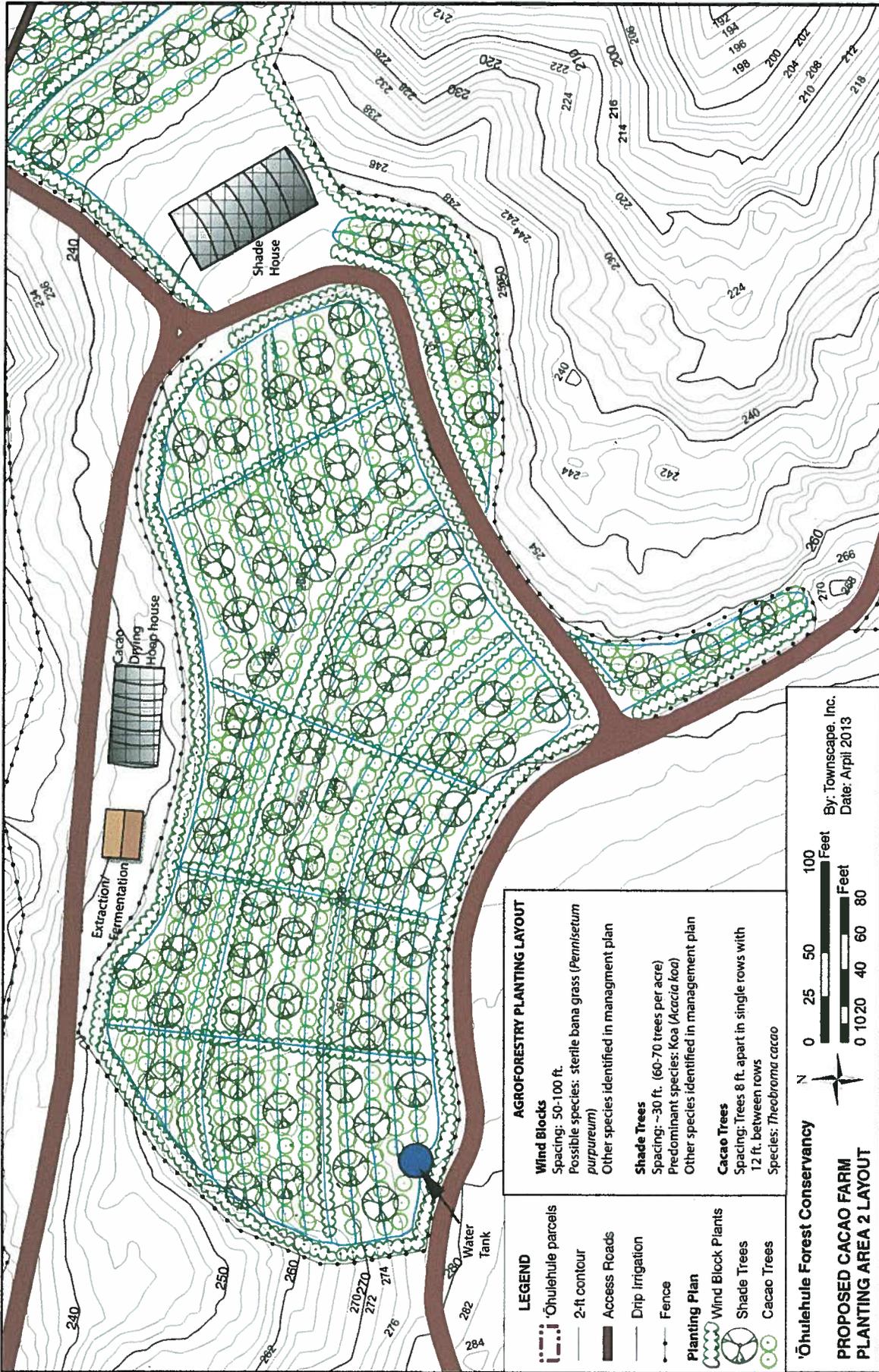
By: Townscape, Inc.  
 Date: April 2013



Ōhulehule Forest Conservancy, LLC

EXHIBIT 3A

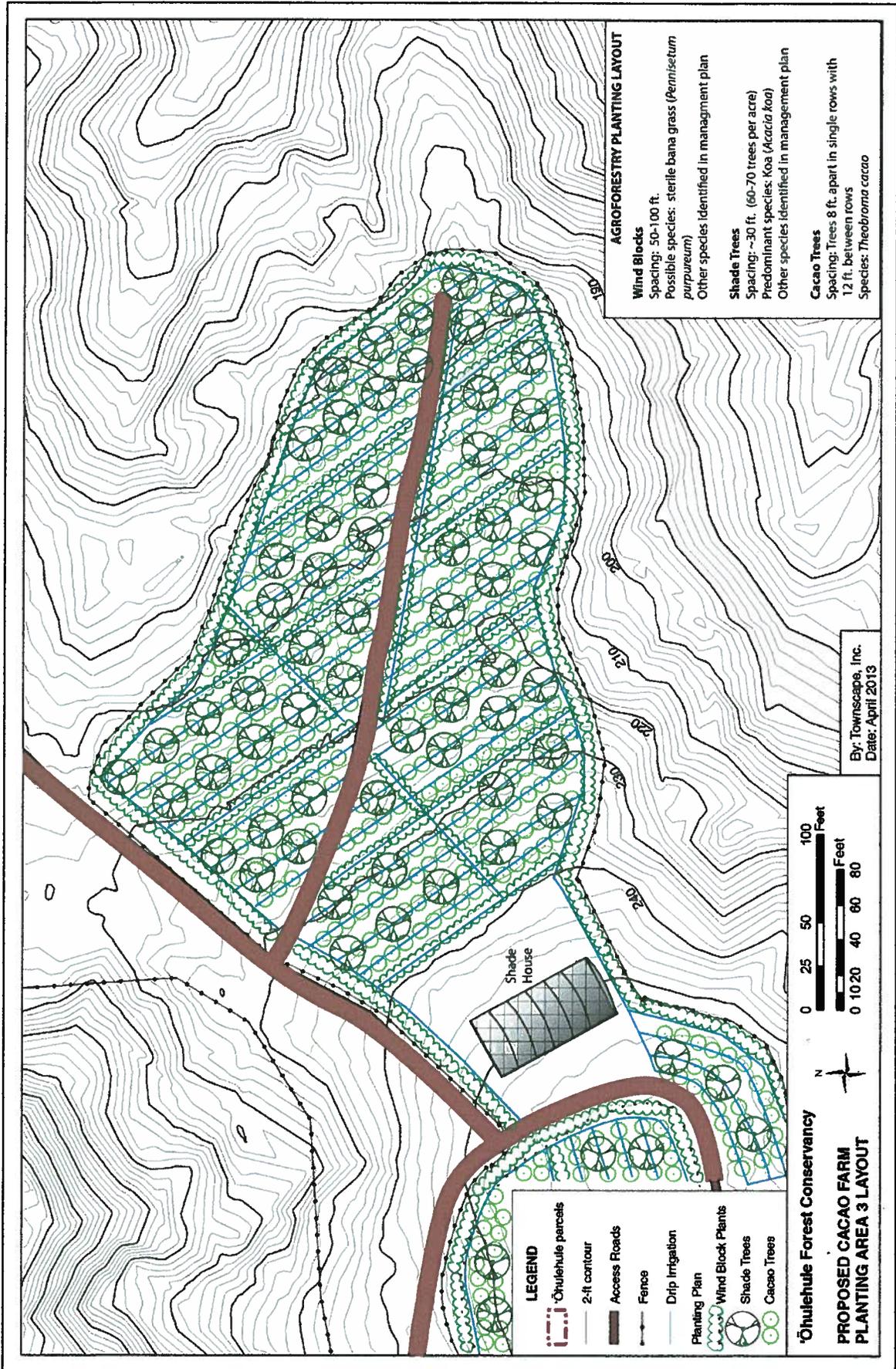
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# EXHIBIT 3B

0A-3677

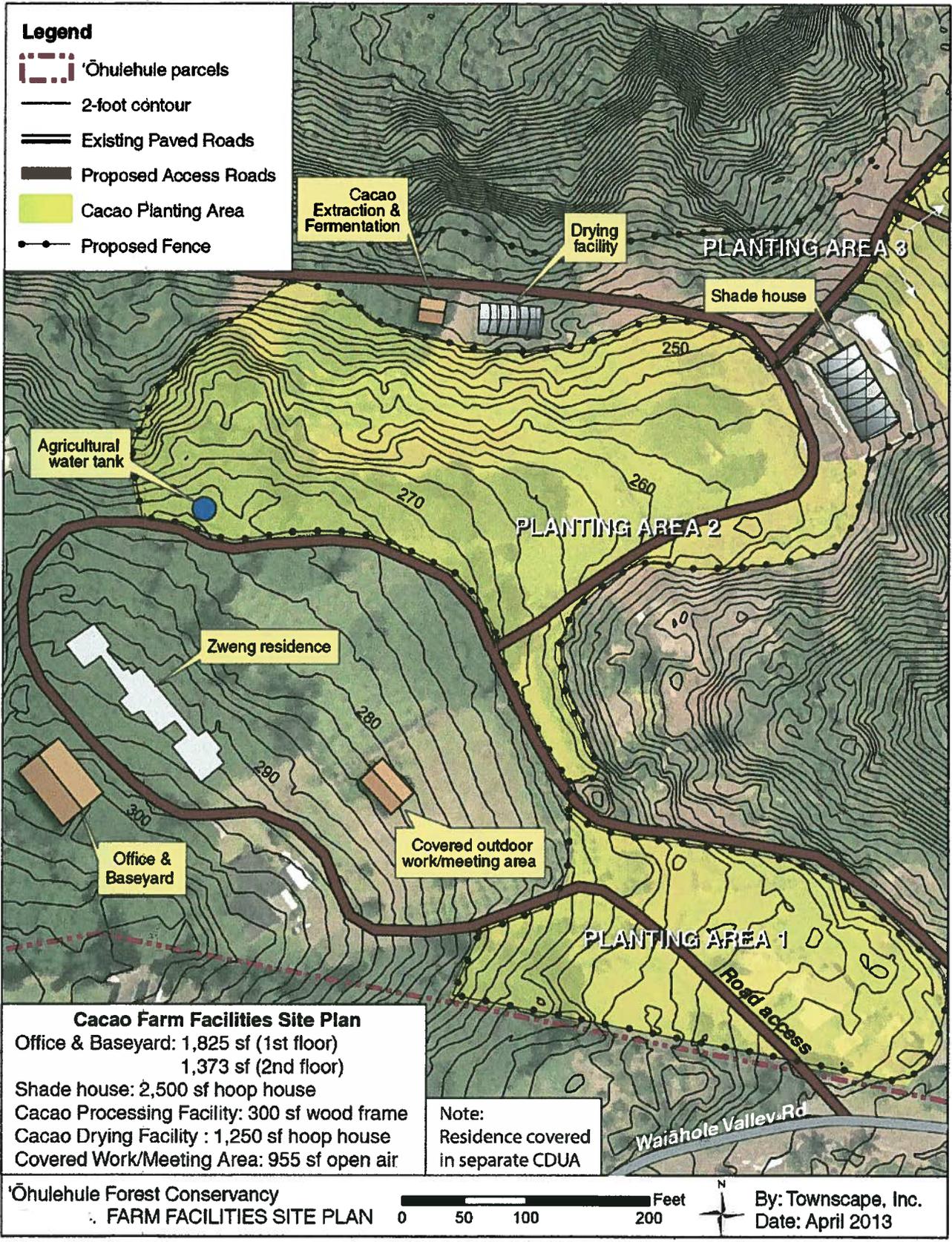
Ōhulehule Forest Conservancy, LLC



# EXHIBIT 3C

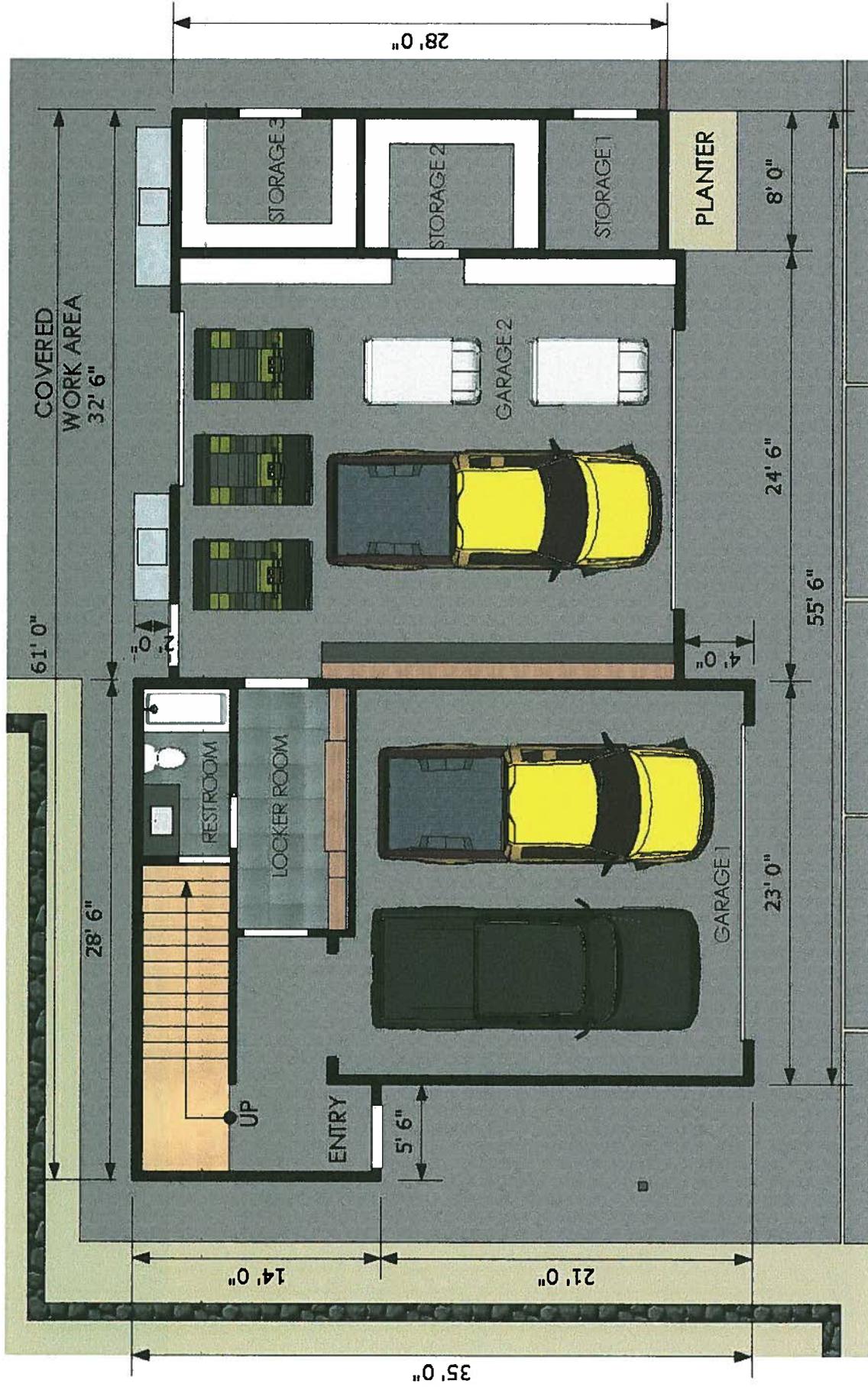
OA-3677

Ohulehule Forest Conservancy, LLC



Ōhulehulé Forest Conservancy, LLC

**EXHIBIT 4**  
 OA - 3677



**‘ŌHULEHULE FOREST CONSERVANCY  
CACAO FARM**

Office/Baseyard 1st Floor Plan



Scale: 1/8" = 1'-0"

**EXHIBIT 5**

0A-3677



GEOFFREY LEWIS ARCHITECT, INC.



**‘ŌHULEHULE FOREST CONSERVANCY  
CACAO FARM**

Office/Baseyard 2nd Floor Plan

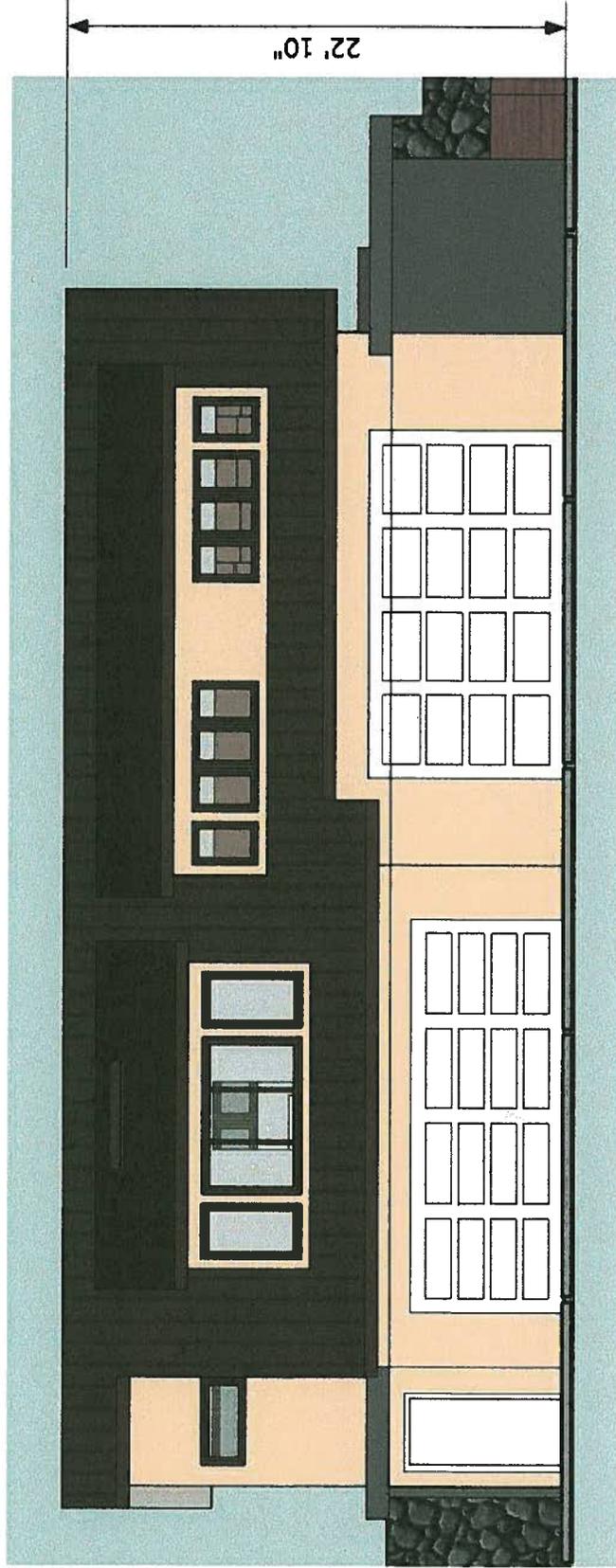


Scale: 1/8" = 1'-0"

**EXHIBIT 6**  
0A-3677



GEOFFREY LEWIS ARCHITECT, INC.



**EXHIBIT 7**  
*OA-3677*

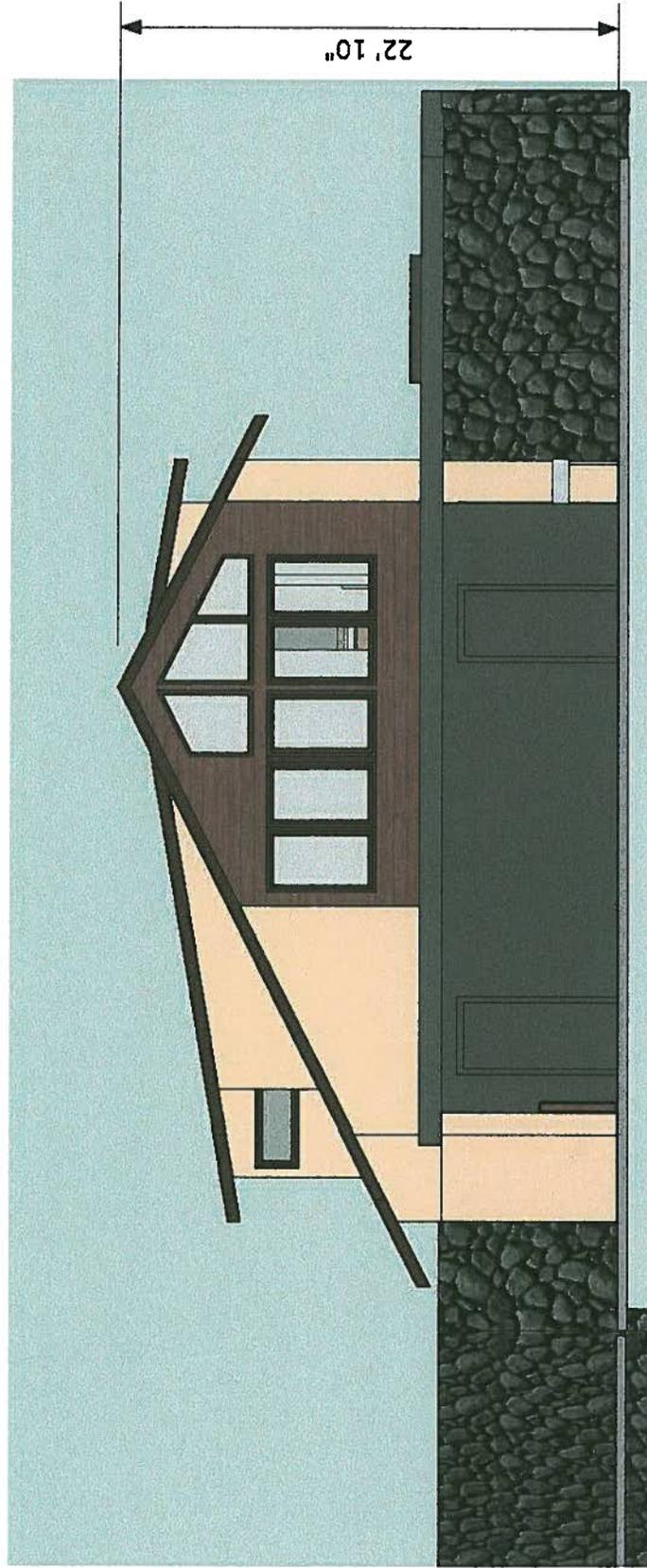
**‘ŌHULEHULE FOREST CONSERVANCY  
 CACAO FARM**

Office/Baseyard Elevation

Scale: 1/8" = 1'-0"



GEOFFREY LEWIS ARCHITECT, INC.



**EXHIBIT 7A**

0A-3677

**CACAO FARM**

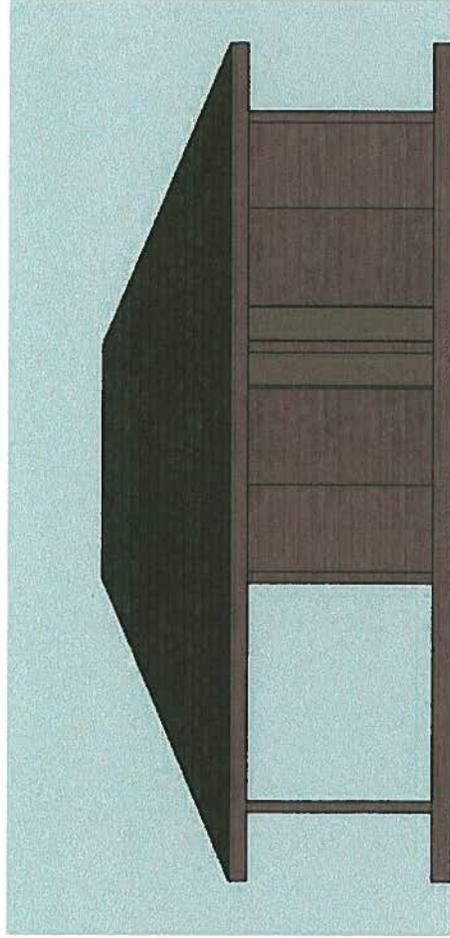
Office/Baseyard Side Elevation

Scale: 1/8" = 1'-0"

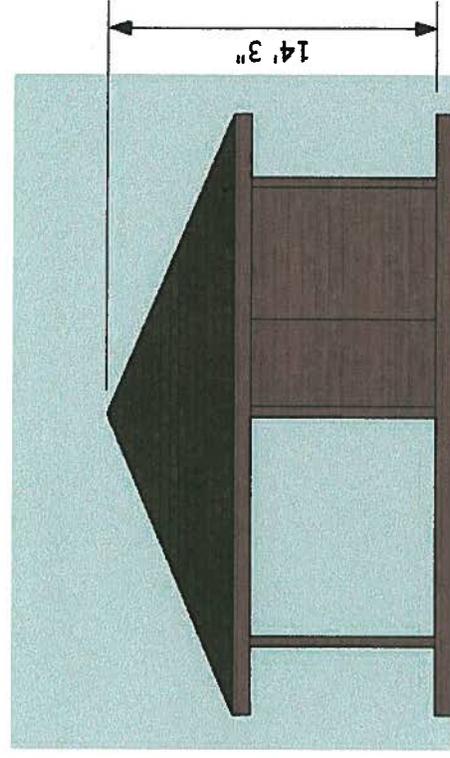
**GLAI**

GEOFFREY LEWIS ARCHITECT, INC.

**'ŌHULEHULE FOREST CONSERVANCY**



FRONT



SIDE

# EXHIBIT 8

OA-3677

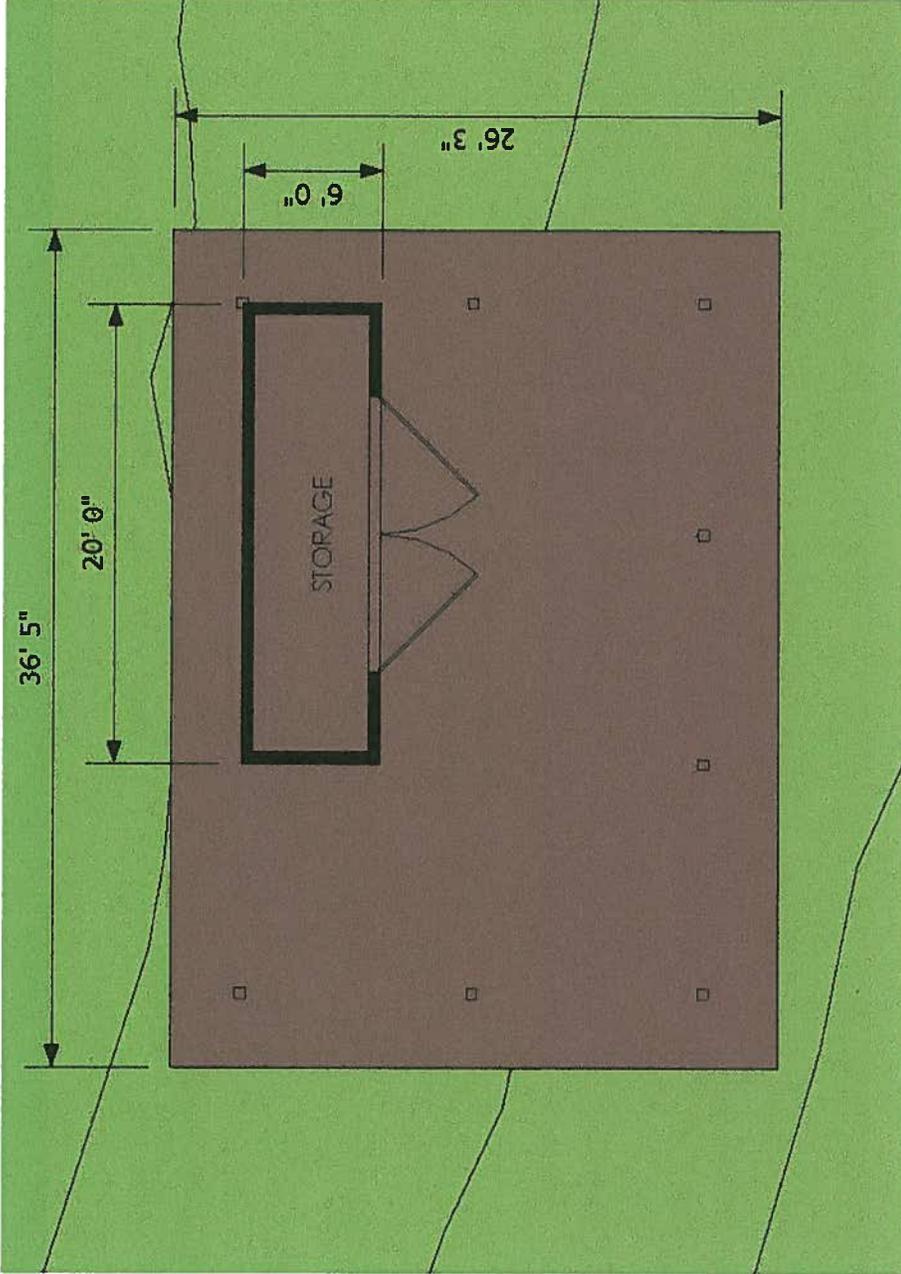


GEOFFREY LEWIS ARCHITECT, INC.

## 'ŌHULEHULE FOREST CONSERVANCY CACAO FARM

: Drying Pavilion/Meeting Area- Front & Side Elevations

Scale: 1/8" = 1'-0"



# EXHIBIT 8A

OA-3677



GEOFFREY LEWIS ARCHITECT, INC.

# 'ŌHULEHULE FOREST CONSERVANCY CACAO FARM

Drying Pavilion/Meeting Area- Floor Plan

Scale: 1/8" = 1'-0"

Roofing : corrugated steel/ aluminum

Rafters: framing lumber (2" by 4"s)

Exterior walls: plywood

Insulation: fiberglass between studs

Studs, posts, headers, joists: framing lumber (2" by 4"s)

Interior walls: plywood

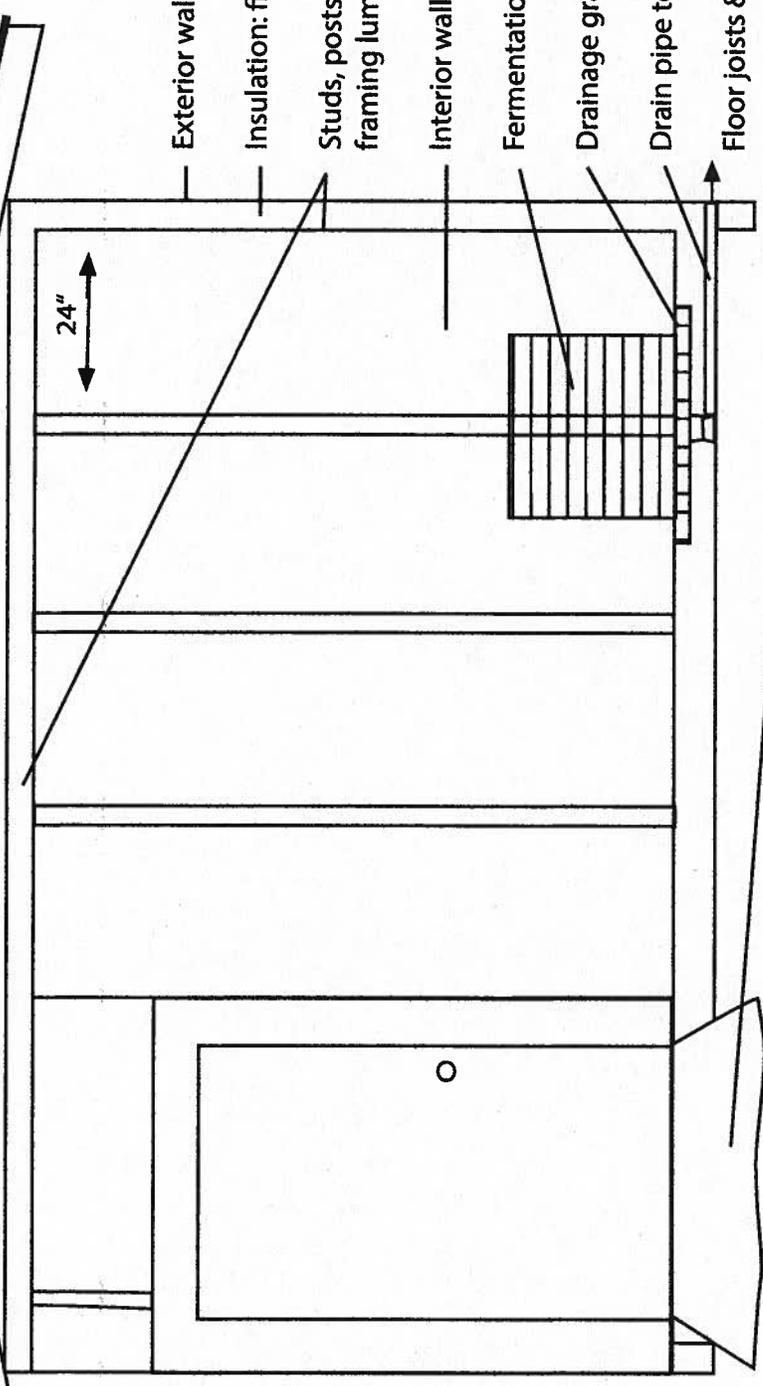
Fermentation boxes: hardwood lumber

Drainage grate: plastic

Drain pipe to septic field: PVC or ABS

Floor joists & bonds: pressure-treated 2" x 4"

Ramp to door: wood or concrete



24"

8'

15'

Front view  
length = 20'  
width = 15'  
h = 8'

**Additional features:**

- Electric supply and breaker box (two 20-amp circuits)
- Lights (fluorescent -- approx. 160 watts) or small window
- Heaters (1500 - 3000 watts)
- Thermostat
- Exhaust fan (20 - 60 watts)
- Water supply (3/4" hose bibbs) and hose

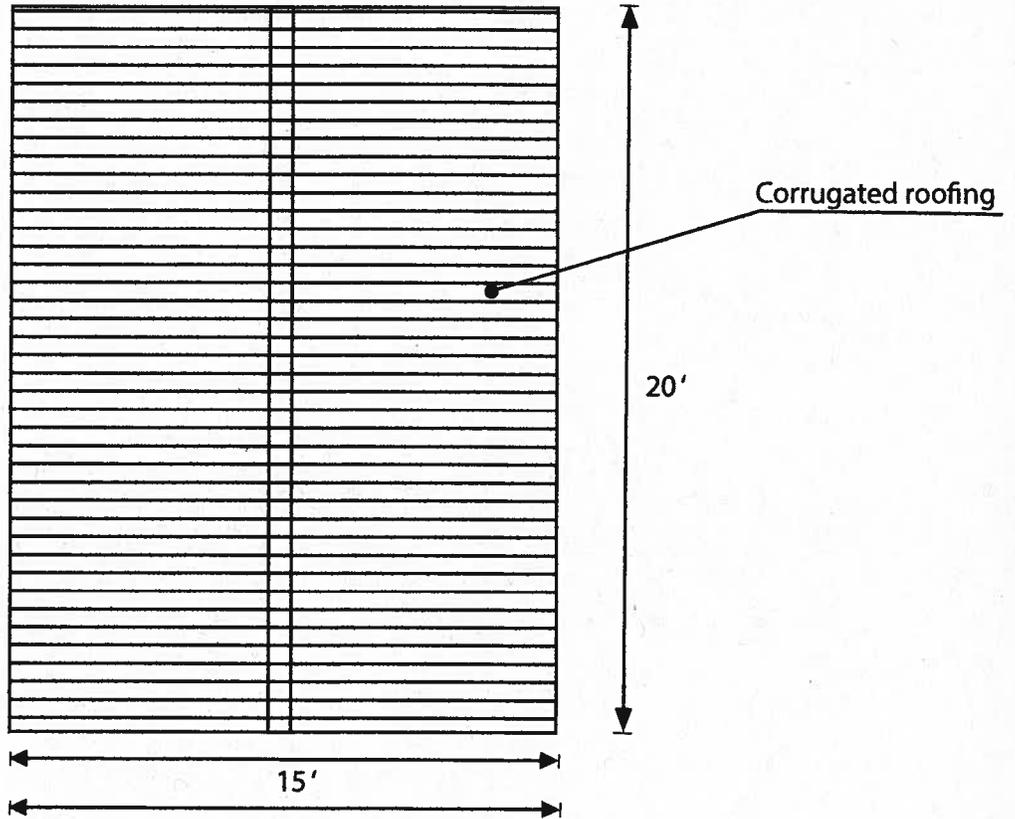
# EXHIBIT 9

0A-3677



CACAO EXTRACTION AND FERMENTATION STRUCTURE

ROOF PLAN



FLOOR PLAN

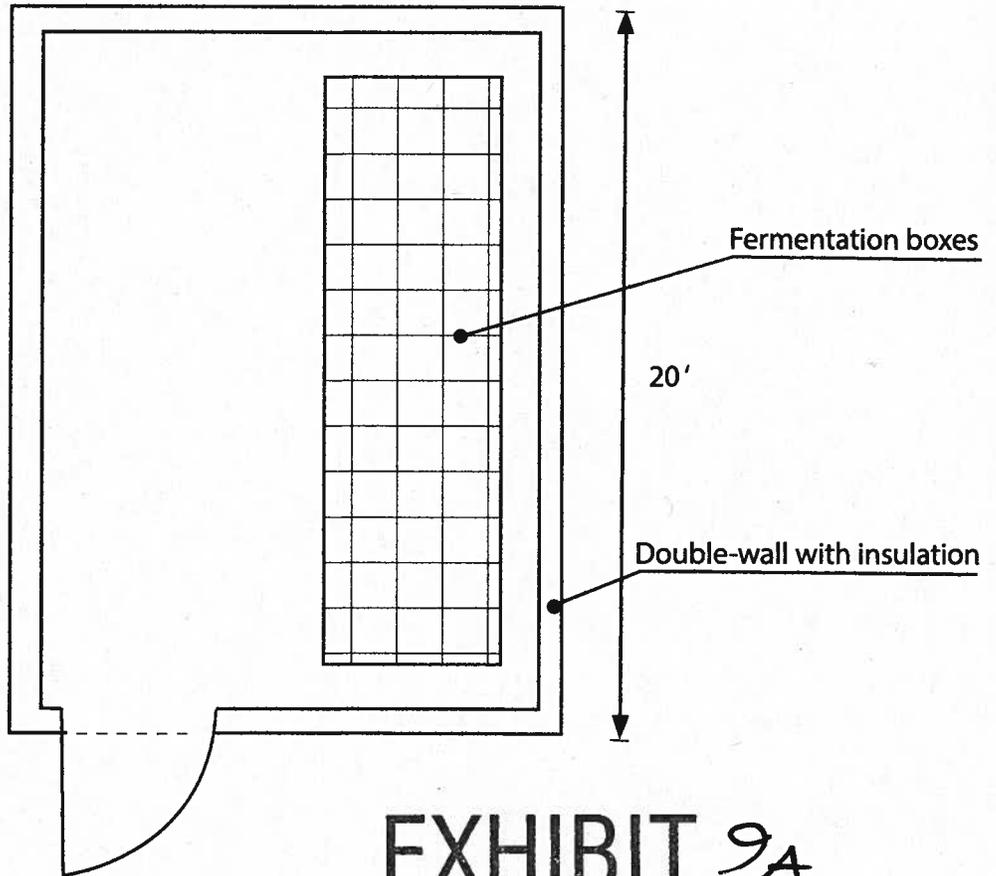


EXHIBIT 9A  
0A-3677

Shade house design

EXHIBIT 10

0A-3677

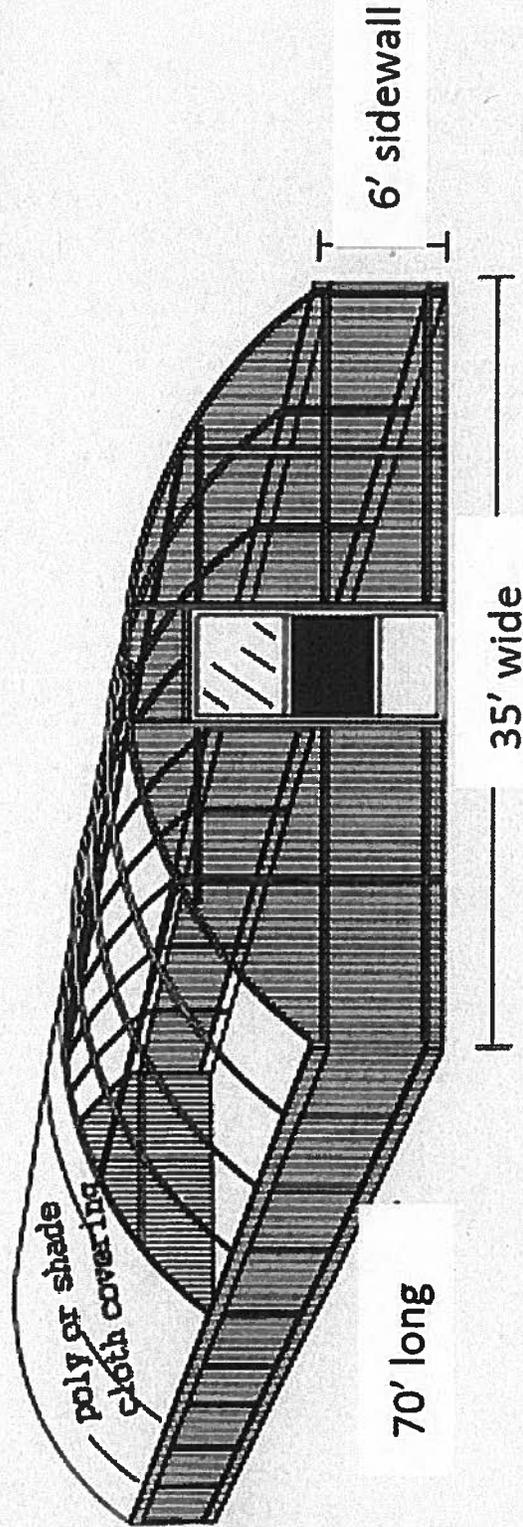
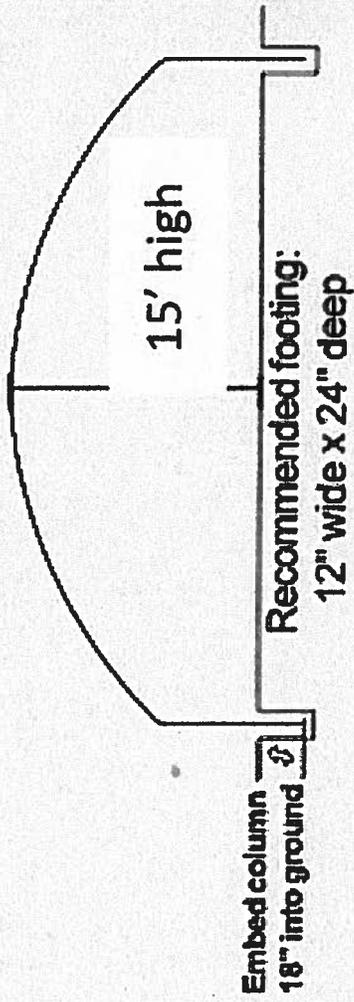


EXHIBIT II  
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