A community is composed of people, as well as places where they live; it is as much a social environment as a physical development. Thus, communities must not only be environmentally sustainable, they must also be socially sustainable.

A socially sustainable development supports more equitable distribution of resources, supports diversity within the community, meets the basic needs of residents and invests in social and human capital, thereby sustaining the quality of life and community livability for all residents into the future.

Socially sustainable development includes the following:

- recognizes, respects and values cultural and social diversity;
- preserve and maintains a high quality of life for all of its residents;
- meets basic needs of food, shelter, education, work, income and safe living and working;
- is equitable, ensuring that the benefits of development are distributed fairly across society;
- promotes education, creativity and the development of human potential;
- preserves our cultural and biological heritage, thus strengthening our sense of connectedness to our history and environment;
- is democratic, promoting citizen participation and involvement;
- promotes the context of “Live Aloha,” with people living together harmoniously and in mutual support and respect for each other

We saved the concept of Social Sustainability for the end of the analysis, to serve as a summary of the many socially-focused actions suggested in prior sections of this Sustainability Plan. Following are just a few of the issues previously mentioned:

- Affordable housing will be incorporated within the development, allowing for a diversity and mix of housing types and options
- Complete streets with walkways and bike lanes, allowing for slow movement through the neighborhoods for easy social interaction
- Space for the relocated County swimming pool
- Allocation for commercial spaces, affording project residents the opportunity to work near where they live
- Proximity to the Middle School affords multi-generational interaction and learning
- Cooperation with the State by making land available for the Kapa’a Bypass Road, helping regional residents
- Project layout and design will create an opportunity for both residents and the community to have a positive effect on their health through walkable and bikable transportation options.
- Consistency with long range planning documents, implementing the community’s vision for the future
Kapaa Highlands Agricultural Master Plan

June 1, 2007

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A. SUMMARY

Livestock (goats) can be raised successfully at Kapaa Highlands. Climate conditions will allow for normal pasture rotation the year around. The ratio of livestock to fenced pasture should be 3 animal units (AU) to 1 acre or better.

The climate and soils at Kapaa Highlands are not ideal for the growing of most commercially viable crops due to the poor soil, strong trade winds, and the salt spray from the ocean.

Goats are sold for their meat value and the local markets on all of the islands are excellent. The intended markets for goats raised on the property are the local Kauai market and the Honolulu market.

The economics for Goats included in this report provides a picture of expected revenue and classifications of operating expenses associated with a Livestock (goat) operation ("Project").

The Association of Condominium Owners of the Kapaa Highlands Condominium ("Association") may choose to operate the Project on behalf of participating owners. Alternatively, the Association may choose to enter into a contractual relationship with a livestock contractor pursuant to a license agreement in which the livestock contractor will pay an annual rent per acre to cover the property, plus a percentage of gross profits.

Livestock grazing is a permissible use within the agricultural districts as outlined under Hawaii Revised Statutes (HRS) Chapter 205, Section 205-4.5.

B. DESCRIPTION

The Kapaa Highlands Subdivision is located in Kapaa, above the Kapaa Bypass Road and adjacent to Kapaa Middle School. The property is further identified by Kauai Tax Map Key No. (4) 4-4-03-01. The total land area is 163.125 acres and the combined grazing area is approximately 101.573 acres.

Almost all of the property is located in the State Land Use Commission Agricultural District and within the Agricultural District of the Comprehensive Zoning Ordinance of the County of Kauai (CZO). As such, owners of subdivision lots will be required to comply with the requirements of HRS Chapter 205 and the CZO. Individual lot owners, through the Association, will be required either to provide a portion of their lot for the grazing of livestock as outlined in this Agricultural Master Plan, or to obtain an amendment to this Agricultural Master Plan to conduct alternative agricultural activities. The Kapaa Highlands is shown on the map attached hereto as Exhibit "A".

C. ENVIRONMENTAL SUITABILITY

1. Climate

The property is exposed to the northeast trade winds and, due to the proximity of the property to the ocean the trade winds will carry salt spray to the property. This is problematic for most commercial crops, but should have no impact on livestock and minimal impact on salt resistant grasses. Annual rainfall is generally between 40 and 50 inches.

2. Soil

The soils are generally well-drained, dark reddish-brown silty clay and silty clay loam. The soil depth is generally between 10 and 15 inches.

The property was previously planted to sugar cane and due to the nature of sugar cane cultivation, these soils can be expected to be low in organic matter and have a low pH (very acid).

A Soils Map for the property is attached hereto as Exhibit "B", and a Soils Inventory (containing technical descriptions of soil types) is attached hereo as Exhibit "C".

The Land Use Bureau Land Classification for this property is B, C, D and E lands, as shown on the Detailed Land Classification Map attached hereto as Exhibits "D" and "E".

3. Drainage

All the soils on the property are well drained indicating that, if good conservation practices are used, they should not erode.

D. CROP SUITABILITY

Due to the generally poor soils and harsh climate, the commercial crops most suited to the area are sugar and pineapple. Both of these industries are declining in Hawaii. Pineapple is no longer grown on Kauai and there is only one sugar mill that remains in operation. With appropriate irrigation and management, both tropical orchard crops (including trees) and some vegetable crops could be grown on the property, although with some difficulty and risk given the physical conditions at the property.
E. LIVESTOCK

1. Association Project

The Association may choose to operate the Project on behalf of all participating owners. In such cases, the Association would be responsible for the creation, care, and marketing of the animals. The participating owners would be responsible for providing the fixed assets (fences, gates, and water systems) on their own lots. The participating owners would be required to pay their pro-rata share of all operational costs to the Association, and would be entitled to their pro-rata share of all profits generated by the Project.

2. Contractor Operation

As an alternative, the Association could hire an independent contractor ("Contractor") to operate the Project. In such cases, the Contractor would own the assets and be responsible for the rotation, care, and marketing of the animals. The Association, through the participating owners, would be responsible for the fixed assets. These assets would include the fences, gates, and water systems. The Contractor would pay the Association a fixed rent per acre of pasture plus a percentage of gross profits, and would be responsible for maintaining the fixed assets associated with the livestock operation.

3. Individual Goat Operators

The Owner may elect to engage in individual goat raising operations within the Owner's Agricultural Area of the Owner's Lot ("Owner's Operation"). In such cases, the following shall apply:

a. The Owner shall be solely responsible for the costs of the Owner's Operation.

b. The Owner shall raise a minimum of three (3) goats for each acre within the Owner's Agricultural Area.

c. The Owner shall submit reports to, and as required by, the Association providing pertinent information concerning the Owner's Operation and in such detail as to comply with and satisfy the reporting requirements contained in the Agricultural Subdivision Agreement and the County Subdivision Approval.

4. Goat Husbandry

It is recommended that a breeding herd with a ratio of 1 buck to 50 does be maintained. Does will produce an average 1.5 kids per year. Kids can be weaned at approximately 2 to 6 months and should be separated from the breeding herd at this point. The gestation period for a doe is approximately 6 months.

The carrying capacity of the pasture at Kapaa Highlands is approximately 3 to 4 animal units (AU) per acre. The breeding herd that consists of bucks and does is considered to be one AU per animal. Kids are 1/2 AU per animal. Therefore, assuming all of the owners became participants in the Project, there would be 101.573 acre of pasture available to carry 355 AU at 3.5 AU per acre. Appendix 

F. HRS 205 COMPLIANCE

Hawaii Revised Statutes Chapter 205 establishes classifications of lands and requirements for use. Section 205-4.5 defines permissible uses within the agricultural districts. This section also defines the soil classification rating that applies to the Chapter.
Kapaa Highlands Agricultural Plan
June 1, 2007

Section 205-4.5 uses the Land Study Bureau's (LSB) soil classification productivity rating system to determine which lands are to be governed by the Chapter. The LSB ratings for Kapaa Highlands are B, C, D and E. Land classification ratings A and B are restricted to the permitted uses as outlined in the section. The cultivation of crops and the raising of livestock are permitted uses. Uses on C, D and E lands also include crop cultivation and the raising of livestock.

G. CONCLUSION

The climate and soils at Kapaa Highlands are not ideal for the growing of most commercially viable crops due to the poor soil, strong trade winds, and the salt spray from the ocean. Thus, a livestock operation provides an economically viable agricultural use for the property.

Either the Association operation of a livestock project, or a contractual relationship between the Association and a livestock Contractor, would allow the agricultural component of the property to be managed as one unit. Individual lot owners would also have the option of compliance with alternate lot uses of livestock grazing or with the cultivation of agricultural crops, provided they obtained the approval of the Planning Commission of the County of Kauai, Subdivision Committee, for an amendment to this Agricultural Master Plan for such alternative agricultural activities.

Livestock grazing is a permissible use within the agricultural districts as outlined under HRS Chapter 205, Section 205-4.5.

Exhibit “A”

Subdivision Map
Exhibit “B”

Soils Map
Exhibit “C”

Soils Inventory Report
## Soils Inventory Report

**TMK (4) 4-3-3:1**

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### Hanalei Series

This series consists of somewhat poorly drained to poorly drained soils on lower lands on the islands of Kauai and Oahu. These soils developed in alluvial deposits from basaltic parent material. Elevations range from near sea level to 300 feet. The annual rainfall ranges from 20 to 120 inches. The mean annual soil temperature is 74°F. The Hanalei series are well-drained alluvial soils and small areas of very poorly drained to poorly drained clay soils that are strongly mottled and are subject to gleying by peat, mud, or saline-marine clay.

The soils are used for crops, pasture, sugarcane, and vegetables. The natural vegetation consists of mesquite, red gum, rubber, jack fruit, and guava.

**Hanalei silty clay, 0 to 2 percent slopes (HnA).**

This soil is on stream bottoms and flood plains. Included in the areas mapped on Kauai along the Wailua River and the Waimea Valley are small areas where the surface layer is 8 to 10 inches of reddish-brown silty clay. Included in the areas mapped on Oahu were small areas of very poorly drained alluvial soils and small areas of very poorly drained to poorly drained clay soils that are strongly mottled and are subject to gleying by peat, mud, or saline-marine clay.

In a representative profile the surface layer, about 10 inches thick, is dark gray and very dark gray silty clay that has brown and reddish-mottled. The subsurface layer is very dark gray and dark gray silty clay about 3 inches thick. The subsurface, about 18 inches thick, is mottled, dark gray and dark gray-brown silty clay loam that has angular blocky structure. The subsoil is stratified alluvium. The soil is strongly acid to very strongly acid in the surface layer and neutral in the subsoil.

Permeability is moderate. Runoff is very slow, and the erosion hazard is no more than slight. The available moisture capacity is about 2.1 inches per foot of soil. Roots penetrate to the water table. Flooding is a hazard.

**Representative profile, Island of Kauai, lat. 22°12'37.8" N. and long. 159°28'47.2" W.**

- AM 0 to 6 inches: dark gray (7.5YR 4/1) silty clay, common mottles of dark brown (7.5YR 5/1), red (2.5YR 4/1), and dark gray (7.5YR 4/1), weak, moderate, and medium, angular blocky structure, very hard, firm, very dense, very plastic, moderately fine and medium texture, common fine and medium, and fine and medium, weak, compacted, and moderately fine and medium, smooth boundary, 2 to 4 inches thick.

- AM 6 to 18 inches: mottled, dark gray (7.5YR 5/1) and dark gray-brown (7.5YR 5/1) silty clay, many distinct mottles of yellowish orange (5YR 6/4), and dark reddish brown (5YR 3/4), weak, firm, moderately fine and medium texture, very hard, firm, very dense, very plastic, common medium and fine texture, common fine and medium, weak, moderately fine and medium, smooth boundary, 3 to 4 inches thick.

- AM 18 to 24 inches: mottled, dark gray (7.5YR 4/1) and dark gray-brown (7.5YR 4/1) silty clay, many distinct mottles of yellowish orange (5YR 6/4), and dark reddish brown (5YR 3/4), weak, firm, moderately fine and medium texture, very hard, firm, very dense, very plastic, common medium and fine texture, common fine and medium, weak, moderately fine and medium, smooth boundary, 3 to 4 inches thick.

- AM 24 to 28 inches: common distinct mottles of strong brown (7.5YR 5/4), dark red (7.5YR 5/3), and reddish brown (7.5YR 4/3), weak, firm, moderately fine and medium texture, very hard, firm, very dense, very plastic, common medium and fine texture, common fine and medium, weak, moderately fine and medium, smooth boundary, 2 to 3 inches thick.

- AM 28 to 30 inches: common distinct mottles of strong brown (7.5YR 5/4), dark red (7.5YR 5/3), and reddish brown (7.5YR 4/3), weak, firm, moderately fine and medium texture, very hard, firm, very dense, very plastic, common medium and fine texture, common fine and medium, weak, moderately fine and medium, smooth boundary, 2 to 3 inches thick.

The Hanalei series range from very poorly drained to poorly drained. The Hanalei series range from 20 to 120 inches. The mean annual rainfall is 74°F. The Hanalei series are well-drained alluvial soils and small areas of very poorly drained to poorly drained clay soils that are strongly mottled and are subject to gleying by peat, mud, or saline-marine clay.
Hanalei Series

This soil is used for taro, pasture, and sugarcane. (Capability classification: Fv, irrigated or nonirrigated; sugarcane group 3; pasture group 7; woodland group 4)

Hanalei silty clay, 2 to 6 percent slopes (HnC).

On this soil, runoff is slow and the erosion hazard is slight. This soil is used for sugarcane, taro, and pasture. (Capability classification Fv, irrigated or nonirrigated; sugarcane group 3; pasture group 7; woodland group 4)

Hanalei clay, 2 to 6 percent slopes (HnB).

This soil has a profile like that of Hanalei silty clay, 2 to 6 percent slopes, except that it is clay loam. Runoff is slow, and the erosion hazard is slight. Stores lower in the surface layer.

This soil is used for sugarcane and pasture. (Capability classification Fv, irrigated or nonirrigated; sugarcane group 3; pasture group 7; woodland group 4)

Hanalei silty clay loam, 0 to 2 percent slopes (HmA).

This soil has a profile like that of Hanalei silty clay, 2 to 6 percent slopes, except for the texture of the surface layer. Also, this soil is underlain by sand at a depth of 30 to 60 inches. Included in mapping were all areas on the Hanalei River bottom that is less than 30 inches deep over sand.

This soil is used for taro, pasture, and sugarcane. (Capability classification Fv, irrigated or nonirrigated; sugarcane group 3; pasture group 7; woodland group 4)

Hanalei poaty silty clay loam, 0 to 2 percent slopes (HnA).

This soil has a profile like that of Hanalei silty clay, 0 to 2 percent slopes, except for the texture of the surface layer. Also, the water table is at the surface.

This soil is used for pasture. (Capability classification Fv, irrigated or nonirrigated; sugarcane group 3; pasture group 7; woodland group 4)

Ioleau Series

This series consists of well-drained soils on uplands of the island of Kauai. These soils developed in material derived from basic igneous rock, probably mixed with volcanic ash. They are geologically described as "equally stable to steep.

Elevations range from 100 to 750 feet. The annual rainfall amounts from 40 to 70 inches. The mean annual soil temperature is 72°F. Ioleau soils are geographically associated with Lilue and Paia soils.

These soils are used for irrigated sugarcane, pasture, pineapple, irrigated orchards, irrigated truck crops, and woodland. The natural vegetation consists of anise trees, koe, koa, and associated shrubs and grasses.

Ioleau clay loam, 8 to 12 percent slopes (IoC).

This soil is an irrigated on the uplands.

In a representative profile the surface layer is dark brown and yellowish-brown clay loam 15 inches thick. The subsoil, 40 to 60 inches thick, is brown and dark reddish-brown clay loam that has subangular blocky structure and is very compact in place. The subsoil is a well-drained soil. The soil is very strongly able to retain acidity and through.

Permeability is slow. Runoff is moderate, and the erosion hazard is moderate. The available water capacity is about 1.4 inches per foot of soil. Roots penetrate a depth of 10 to 15 inches or to the plow depth.

Representative profile: Island of Kauai, lat. 23°07'32"N, long. 157°11'33"W.

Hanalei Series

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Ioleau Series

Ioleau silt loam, 2 to 6 percent slopes (Io).  
This soil has a profile like that of Ioleau silt loam. 8 to 12 percent slopes, except that it is 10 to 18 inches deeper in the compact layer. Runoff is slow, and the erosion hazard is slight. Roots penetrate to a depth of 25 to 40 inches.

This soil is used for sugarcane, pasture, pineapple, orchards, and truck crops. (Capability classification 5, irrigated or nonirrigated; sugarcane group 1; pineapple group 6; pasture group 6; woodland group 6)

Ioleau silt loam, 12 to 20 percent slopes, eroded (IoE2).  
This soil is similar to Ioleau silt loam. 8 to 12 percent slopes, except that it is moderately steep and part of the surface layer has been removed by erosion. Runoff is rapid, and the erosion hazard is moderate to severe.

This soil is used for sugarcane, pineapple, and pasture. (Capability classification 5, irrigated or nonirrigated; sugarcane group 1; pineapple group 6; pasture group 6; woodland group 8)

Ioleau silt loam, 20 to 35 percent slopes, eroded (IoE2).  
This soil is similar to Ioleau silt loam. 8 to 12 percent slopes, except that it is steep and most of the surface layer has been removed by erosion. Runoff is rapid, and the erosion hazard is severe.

This soil is used for pasture, woodland, sugarcane, pineapple, and water supply. (Capability classification 5, nonirrigated; pasture group 6; woodland group 8)

Lihue Series

Lihue silt clay, 0 to 8 percent slopes (Li).  
This soil is on the lower slopes of the windward side, usually on the lower slopes. It is used for all crops except for very dry soils. It is moderately fertile and is used for all crops except for very dry soils. It is moderately fertile and is used for all crops except for very dry soils.

Lihue silt clay, 0 to 8 percent slopes (LiB).  
This soil is on the lower slopes of the windward side, usually on the lower slopes. It is used for all crops except for very dry soils. It is moderately fertile and is used for all crops except for very dry soils.

Representative profile: Island of Kauai, lat. 21°50'N, long. 158°21'W.  
A-1 to 6 inches, discolored (2.89% N) black clay, medium and weak (8 to 4) when wet, deep (30 to 40) when dry. Root distribution is strong, with many roots at the surface and very few at depth. Soils are well-drained and contain many roots at the surface and very few at depth. Soils are well-drained and contain many roots at the surface and very few at depth. Soils are well-drained and contain many roots at the surface and very few at depth.

B-1 to 31 inches, dark reddish-brown (5YR 4/1) clay, medium and weak (8 to 4) when dry, very fine, and plastic. Many roots, very fine and fine pores. Many very fine and fine pores. Many very fine and fine pores. Many very fine and fine pores.

C-1 to 31 inches, dark reddish-brown (5YR 4/1) clay, medium and weak (8 to 4) when dry, very fine, and plastic. Many roots, very fine, and fine pores. Many very fine and fine pores. Many very fine and fine pores. Many very fine and fine pores. Many very fine and fine pores.
Lihue silty clay, 0 to 15 percent slopes (LIC).

On this soil, runoff is slow and the erosion hazard is slight. This soil is used for sugarcane, pineapple, pasture, truck crops, orchards, wildlife habitat, and homesites. (Capability classification: site, irrigated or nonirrigated; sugarcane group 1; pineapple group 6; pasture group 5; woodland group 5)

Lihue silty clay, 15 to 25 percent slopes (LhD).

On this soil, runoff is medium and the erosion hazard is moderate. This soil is used for sugarcane, pineapple, pasture, wildlife habitat, and homesite. (Capability classification: site, irrigated or nonirrigated; sugarcane group 1; pineapple group 6; pasture group 5; woodland group 5)

Lihue silty clay, 25 to 40 percent slopes, eroded (LhE2).

This soil is similar to Lihue silty clay, 6 to 11 percent slopes, except that the surface layer is thin. Runoff is rapid, and the erosion hazard is severe.

This soil is used for pasture, woodland, and wildlife habitat. Small areas are used for pineapple and sugarcane. (Capability classification: site, nonirrigated; pasture group 5; woodland group 5)

Lihue gravelly silty clay, 0 to 8 percent slopes (LGB).

This soil is similar to Lihue silty clay, 0 to 8 percent slopes, except that it contains more sand-size particles and has brighter colors in the B horizon. Included in mapping are small areas of soils that have a dark yellowish brown, fibric subsoil.

This soil is used for sugarcane, pasture, and homesites. (Capability classification: site, irrigated or nonirrigated; sugarcane group 1; pineapple group 5; pasture group 5; woodland group 5)

Lihue gravelly silty clay, 8 to 15 percent slopes (LIC).

On this soil, runoff is slow and the erosion hazard is slight. Included in mapping were areas where the slope is less than 15 percent.

This soil is used for sugarcane, pasture, wildlife habitat, and homesites. (Capability classification: site, irrigated or nonirrigated; sugarcane group 1; pineapple group 6; pasture group 5; woodland group 5)

Marsh (M2) consists of wet, periodically flooded areas covered dominantly with grasses and bushes or other herbaceous plants. It occurs as small, low-lying areas along the coastal plains. Water stands on the surface, but marsh vegetation thrives. The water is fresh or brackish, depending on proximity to the ocean. Included in mapping were small areas of mangrove swamp and small areas of open water. (Capability classification: site, nonirrigated)
Mokuleia Series

This soil series consists of well-drained soils along the coastal plains on the islands of Oahu and Kauai. These soils formed in recent alluvium deposited over coral sand. They are shallow and nearly level. Elevations range from nearly sea level to 160 feet. The annual rainfall amounts to 15 to 49 inches on Oahu and 60 to 100 inches on Kauai. The mean annual soil temperature is 74°F. Mokuleia soils are geographically associated with Hanalei, Kekaha, and Kamehameha soils.

In this survey area a poorly drained variant of the Mokuleia series was mapped. This soil, Mokuleia clay loam, poorly drained variant, is described in alphabetical order, along with other mapping units of this series.

These soils are used for sugarcane, truck crops, and pasture. The natural vegetation consists of kikuyu, leucaena, and hibiscus in the drier areas and reseeds grasses, legumes, and vines in the wetter areas.

Mokuleia clay loam (Ma).

This soil occurs as small areas on the coastal planes. It is nearly level. Included in mapping were small areas of surface soils, small areas of very deep, well-drained soils in drier areas, and small areas of poorly drained clay loam soils under wetter areas.

In a representative profile the surface layer is very dark grayish-brown clay loam about 16 inches thick. The next layer, 34 to 48 inches thick, is dark-brown and light-gray, single gravel sand and loamy sand. The lower layer is neutral in reaction, and the underlying material is moderately alkaline.

Permeability is moderate in the surface layer and rapid in the subsoil. Runoff is very slow, and the erosion hazard is no more than slight. The available water capacity is about 1.3 inches per foot in the surface layer and about 1 inch per foot in the subsoil. In places roots penetrate to a depth of 2 feet or more.

Representative profile: Island of Oahu, lat. 21° 34′ 49″ N. and long. 158° 10′ 00″ W.

This soil is used for sugarcane, truck crops, and pasture. Capability classification I for irrigated, IIa for non-irrigated: sugarcane group 1; pasture group 3.

Mokuleia fine sandy loam (Mf).

This soil occurs on the eastern and northern coastal plains of Kauai. It is nearly level. This soil has a profile like that of Mokuleia clay loam, except for the texture of the surface layer.

Permeability is moderately rapid in the surface layer and rapid in the subsoil. Runoff is very slow, and the erosion hazard is slight. The available water capacity is about 1 inch per foot in the surface layer and about 0.7 inch per foot in the subsoil. Included in mapping were small areas where the slope is as much as 8 percent.

This soil is used for pasture. (Capability classification I for irrigated, IIa for non-irrigated: sugarcane group 1; pasture group 3).

Mokuleia loam (Ms).

This soil has a profile like that of Mokuleia clay loam, except that the surface layer is loamy and the most places is about 9 inches thick. It is nearly level.

This soil is used for sugarcane, truck crops, and pasture. (Capability classification I for irrigated, IIa for non-irrigated: sugarcane group 1; pasture group 3).

Mokuleia clay loam, poorly drained variant (Mfa).

This soil occurs on Kauai. It is nearly level. The site is very drained, and in this way, it differs from other soils of the Mokuleia series. The surface layer is dark brown to black and is mottled.

This soil is used for sugarcane, taro, and pasture. (Capability classification I for irrigated, IIa for non-irrigated: sugarcane group 3; pasture group 3).

Mokuleia clay (Mba).

This soil has a profile like that of Mokuleia clay loam, except for the texture of the surface layer. It is nearly level. Permeability is slow in the surface layer. Workability is difficult because of the sticky, plastic clay.
Pohakupu Series

This series consists of well-drained soils on terraces and alluvial fans on the islands of Oahu and Kauai. These soils formed in alluvium derived from basic igneous material. They are generally steep to moderately sloping. Elevations range from 40 to 250 feet. The annual rainfall ranges from 40 to 60 inches. The mean annual soil temperature is 73° F. Pohakupu soils are geographically associated with Alaeona, Pueo, and Lihue soils.

These soils are used for sugarcane, pineapple, truck crops, pasture, and homesteads. The natural vegetation consists of guava, Christmas berry, Japanese tea, koa hao, and knysna grass.

Pohakupu silty clay loam, 0 to 8 percent slopes (PKII).

This soil has a smooth slope and occurs on terraces and alluvial fans. The slopes are mainly 5 to 8 percent. Included in mapping were small areas of Alaeona and Weleleu soils and small areas where the slope is as much as 15 percent. Also included on Kauai were small areas where the terrain is silty clay and small areas that have a hue of 2.5YR in the subsoil.

In a representative profile the surface layer is dark reddish-brown silty clay loam about 12 inches thick. The subsoil, 40 to more than 90 inches thick, is dark reddish-brown and dark-brown silty clay loam that has angular and subangular blocky structure. The substratum is strongly weathered gravel. The soil is slightly acid to medium acid.

Permeability is moderately rapid. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 2 inches per foot of soil. In places roots penetrate to a depth of 5 feet or more.

Representative profile: Island of Oahu, lat. 21°22'53" N., long. 157°45'16" W.

Ap 0 to 12 inches, dark reddish-brown (7.5YR 3/6) silty clay loam, weathered brown (7.5YR 4/4) where dry, very fine, loamy, slightly plastic, subangular blocky structure, rather hard, friable, sticky and plastic, abundant roots, very fine to very fine, very fine, common, very fine, and very fine, coarse, moderate efflorescence with hydrous ferric oxide, slightly acid, abrupt smooth boundary, 8 to 10 inches thick.

B2 from 21 to 31 inches, dark reddish-brown (7.5YR 3/4) silty clay loam, reddish-brown (7.5YR 4/4) where dry, very fine, loamy, subangular blocky structure, hard, friable, very fine to very fine, very fine, abundant roots, common, very fine, moderate efflorescence with hydrous ferric oxide, slightly acid, abrupt smooth boundary, 4 to 5 inches thick.

B2 from 31 to 58 inches, dark brown (7.5YR 4/6) silty clay loam, brown (7.5YR 4/4) when dry, clay loamy, very fine, loamy, subangular blocky structure, hard, friable, very fine, very fine, common, moderate efflorescence with hydrous ferric oxide, slightly acid, abrupt smooth boundary, 4 to 5 inches thick.

B3 from 58 to 85 inches, brown (7.5YR 4/4) clay loam, brown (7.5YR 4/4) when dry, clay loamy, very fine, angular, subangular blocky structure, very hard, friable, very fine, very fine, common, moderate efflorescence with hydrous ferric oxide, slightly acid, abrupt smooth boundary, 4 to 5 inches thick.

B4 from 85 to 120 inches, brown (5Y 7/3) clay loam, brown (7.5YR 4/4) when dry, clay loamy, very fine, angular, subangular blocky structure, hard, friable, very fine, very fine, common, moderate efflorescence with hydrous ferric oxide, slightly acid, abrupt smooth boundary, 10 to 15 inches thick.

Efflorescence with hydrous ferric oxide ranges from slight to moderate in the upper part of the profile and slight to more abundant in the lower part of the profile. The A horizon ranges from 2 to 3 inches thick and varies between 0 and 1.5 inches thick. The B horizon ranges from 7.5YR to 2.5YR in hue and from 3 to 4 in chroma and value when wet. The B horizon ranges from 7.5YR to 2.5YR in hue and from 3 to 4 in chroma and value when dry.

This soil is used for pasture, truck crops, and homesteads on Oahu and for sugarcane and pineapple on Kauai. (Capability classification: Irrigated land if nonirrigated; sugarcane group 1, pasture group 5, woodland group 5.)

http://www.ctahr.hawaii.edu/soilsurvey/5is/soilseries/PohakupuSeries.htm
3/7/2007
Puhi Series

This series consists of well-drained soils on uplands on the island of Kauai. These soils are developed in residuum derived from basic igneous rock. They are nearly level to steep. Elevations range from 175 to 300 feet. The annual rainfall amounts to 60 to 80 inches. The mean annual soil temperature is 72°F. Puhi soils are geographically associated with Choe and Kepua soils.

These soils are used for sugarcane, pineapple, truck crops, orchards, pasture, woodland, wildlife habitat, water supply, and homesteads. The natural vegetation consists of guava, Java plum, paraguassu, Kula alpinus, eucalyptus, jawo, yellow flag grass, and myoporecaz.

Puhi silty clay loam, 0 to 3 percent slopes (PhN).

This soil is on broad interfluves on the uplands.

A representative profile is shown on page 12 inches thick. The subsoil, about 48 inches thick, is reddish brown and dark reddish brown silty clay loam and clay loam that has a subangular blocky structure. The subsoil is silty clay. The surface layer is very strongly acid. The subsoil is slightly acid to medium acid.

Permeability is moderately rapid. Runoff is very slow, and there is no erosion hazard. The available water capacity is about 1.5 inches per foot of soil. In places, roots penetrate to a depth of 5 feet or more.

Representative profiles: Island of Kauai, lat. 22°30'11"N, long. 159°27'16"W.

Puhl silty clay loam, 2 to 8 percent slopes (PhB).

On this soil, runoff is slow and the erosion hazard is slight. This soil is used for sugarcane, pineapple, pasture, and orchards. (Capability classification: Not irrigated or nonirrigated: sugarcane group 1; pineapple group 5; pasture group 5; woodland group 7)

Puhl silty clay loam, 8 to 15 percent slopes (PhC).

On this soil, runoff is slow and the erosion hazard is slight. This soil is used for sugarcane, pineapple, pasture, and orchards. (Capability classification: Not irrigated or nonirrigated: sugarcane group 1; pineapple group 5; pasture group 5; woodland group 7)

Puhl silty clay loam, 15 to 25 percent slopes (PhD).

On this soil, runoff is medium and the erosion hazard is moderate. Included in mapping were small, eroded areas.

This soil is used for sugarcane, pineapple, orchards, pasture, woodland, wildlife habitat, and water supply. (Capability classification: Not irrigated or nonirrigated: sugarcane group 1; pineapple group 5; pasture group 5; woodland group 7)

Puhl silty clay loam, 25 to 40 percent slopes (PhE).

On this soil, runoff is rapid and the erosion hazard is severe.

This soil is used for pasture, woodland, wildlife habitat, and water supply. (Capability classification: Not irrigated: pasture group 8; woodland group 7)
Rough Broken Land

Rough broken land (RRL) consists of very steep and broken by numerous intermittent drainage channels. In most places it is not arable. It occurs in gulches and as small terraces on all the islands except Oahu. The slope is 40 to 70 percent. Elevations range from near sea level to about 8,000 feet. The local relief is generally between 25 and 500 feet. Runoff is rapid, and gully erosion is acute. The annual rainfall amounts to 25 to more than 200 inches.

These soils are variable. They are 20 to more than 80 inches deep over soft, weathered rock. In most places some weathered rock fragments are mixed with the soil material. Small areas of rock outcrops, stones, and soil slips are common. Included in mapping were areas of colluvium and alluvium along gulch bottoms.

This land type is used primarily for watershed and wildlife habitat. In places it is used also for pasture and woodland. The dominant natural vegetation in the drier areas consists of guava, ferns, Nasturtium, bermsuddegrass, low hakea, and mokulau grass. Ohia, koa, ma'u, and fuka are dominant in the wetter areas. Pu`u`ukoa, 'oali`, and sweet vernals are common at the higher elevations. (Capacities classification: VIW, nonirrigated)

Exhibit “D”

LSB Map 100
Exhibit “F”

Economics For Goats
Island of Kauai

ALISH

- Prime
- Unique
- Other

Major Roads

SITE

Kapaa

Exhibit "G.1" of "C"
### Economics for Goats

#### General Assumptions

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>142</td>
</tr>
<tr>
<td>Animal units per acre</td>
<td>3.5</td>
</tr>
<tr>
<td>Total animal units (AU)</td>
<td>597</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Breeding herd</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bucks (1)</td>
<td>9%</td>
</tr>
<tr>
<td>Does (10)</td>
<td>92%</td>
</tr>
<tr>
<td>Kids per doe per year</td>
<td>1.5</td>
</tr>
<tr>
<td>Total animal units (AU)</td>
<td>358</td>
</tr>
</tbody>
</table>

Note: Bucks & Does = 1 AU each, Kids = 1/2 AU each.

#### Annual Revenue from Goat Sales

<table>
<thead>
<tr>
<th>Goat Sales</th>
<th>Units</th>
<th>Unit Price</th>
<th>Annual Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Kids</td>
<td>9%</td>
<td>225</td>
<td>$15,000</td>
</tr>
<tr>
<td>Horned Kids (FOB Lincoln)</td>
<td>90%</td>
<td>75</td>
<td>$10,400</td>
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<tr>
<td>Total</td>
<td></td>
<td>300</td>
<td>$25,400</td>
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</table>

#### Expenses

<table>
<thead>
<tr>
<th>Expense</th>
<th>Units</th>
<th>Unit Cost</th>
<th>Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor - Part-time labor (hours)</td>
<td>520</td>
<td>$15.00</td>
<td>$7,800</td>
</tr>
<tr>
<td>Feed - Barley Corn (per head)</td>
<td>208</td>
<td>$2.90</td>
<td>$607</td>
</tr>
<tr>
<td>Minerals - Mineral block (per head)</td>
<td>208</td>
<td>$12.00</td>
<td>$2,572</td>
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<tr>
<td>Veterinary Supplies - Worming (per head)</td>
<td>208</td>
<td>$1.20</td>
<td>$267</td>
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<tr>
<td>Water - Annual requirement (3 gallons per head per day)</td>
<td>208</td>
<td>$2.03</td>
<td>$417</td>
</tr>
<tr>
<td>Repair &amp; Maintenance - Repair fences, gates, water system</td>
<td></td>
<td>$1,200</td>
<td>$1,200</td>
</tr>
<tr>
<td>Repair &amp; Maintenance - Vehicles - Maintenance and Fuel</td>
<td></td>
<td>$2,000</td>
<td>$2,000</td>
</tr>
<tr>
<td>Hauling Goats (per head)</td>
<td>208</td>
<td>$0.70</td>
<td>$144</td>
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<tr>
<td>Total Direct Costs</td>
<td></td>
<td></td>
<td>$4,675</td>
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#### Overhead

<table>
<thead>
<tr>
<th>Overhead Expense</th>
<th>Units</th>
<th>Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lease Rent (unit cost per acre per year)</td>
<td>35.20</td>
<td>$3,670</td>
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<tr>
<td>Administration</td>
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<td>$600</td>
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<td>Management</td>
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<td>$5,600</td>
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<td>Other</td>
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<td>$280</td>
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<tr>
<td>Total Overhead</td>
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<td>$9,550</td>
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#### Net Operating Profit (Loss)

| Net Operating Profit (Loss) | $22,250 |