HoKua Place
Section 343-5e HRS Second Draft
Environmental Impact Statement (2nd DEIS)
Volume II-B
Exhibits I to Q

Prepared for:
Accepting Authority
State of Hawai‘i Land Use Commission
&
Petitioner
HG Kaua‘i Joint Venture LLC
Prepared by:
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(808) 947-2467
ron@agorjehnarch.com

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# Volume II-B Contents

| Exhibit I | Kapa’a Highlands Legal Description and Map | 373-378 |
| Exhibit J | Botanical Survey Kapa’a Highlands Phase II, TMK (4) 4-3-003:001 | 379-383 |
| Exhibit K | Biological Surveys Conducted on the Kapa’a Highlands Phase II Project Site TMK: (4) 4-3-003:001, Island of Kaua’i, Hawai’i | 384-393 |
| Exhibit L | An Archaeological Assessment with Subsurface Testing for the Kapa’a Highlands Phase II Project, Kawainahau District, Kaua’i TMK (4) 4-3-3:1 | 394-427 |
| Exhibit M | A Cultural Impact Assessment for the Proposed Kapa’a Highlands Phase II Kapa’a Ahupua’a, Kawainahau District, Kaua’i | 428-457 |
| Exhibit N.1 | Aerial Topography Map and Full Size Survey | 458 |
| Exhibit N.2 | Survey | 459 |
| Exhibit O | Kaua’i County Planning Commission Tentative Subdivision Approval for HoKua Farm Lots, June 19, 2014 | 460-464 |
| Exhibit P | Invertebrate Study (New) | 465-489 |
| Exhibit Q | Comments & Responses on the DEIS | 490-521 |
| Group 1 | Letters of Support | 490-521 |
| Group 2 | Responses to Primarily Traffic Comments | 522-559 |
| Group 3 | Responses to Comments on Community Related Concerns | 560-590 |
| Group 4 | Responses to Other Individual Comments | 591-601 |
| Group 5 | Responses to Agencies and Organizations | 602-654 |
Exhibit I
Kapa’a Highlands Legal Description and Maps

All of that certain parcel of land, being a portion of Parcel 1 of Tax Map Key 4-3-03 (4th Division), being a portion of Grant 5266 to Rufus P. Spalding situate at Kapa’a, Kauai, Hawaii and more particularly described as follows:

Beginning at the “+” on a concrete driveway at the East corner of this parcel of land at the North corner of Grant 8216 to Joe Martin on the Southwest side of Olohena Road, the coordinates of which referred to Government Survey Triangulation Station “NONOU” being 5,660.65 feet North and 11,159.65 feet East and running by azimuths measured clockwise from True South:

1. 35' 59"
2. 22' 52"
3. 100' 09"
4. 13' 38"
5. 27' 12"
6. 37' 25"
7. 96' 52"
8. 24' 40"
9. 318' 05"
10. 30' 57"
11. Thence along Kapa’a Agricultural Lot 1 on a curve to the right with a radius of 233.97 feet, the chord azimuth and distance being:
   62' 33' 30"
   266.22 feet
   to a pipe;
12. 94' 10"
13. 194' 30"

feet along Kapa’a Agricultural Lot 1 to a pipe;

feet along Kapa’a Agricultural Lot 1 to a pipe;

feet along Kapa’a Agricultural Lot 1 to a pipe;

feet along Kapa’a Agricultural Lot 1 to a pipe;

feet along Kapa’a Agricultural Lot 1 to a pipe;

feet along Kapa’a Agricultural Lot 1 to a pipe;

feet along Kapa’a Agricultural Lot 1 to a pipe;

feet along Kapa’a Agricultural Lot 1 to a pipe;

feet along Kapa’a Agricultural Lot 1 to a pipe;

feet along Kapa’a Agricultural Lot 1 to a pipe;

feet along Kapa’a Agricultural Lot 1 to a pipe;
14.  91° 20' feet along Grant 5237 to Hee Fat to a pipe;
15.  34° 24' 140.00 feet along Grant 5237 to Hee Fat and the Care
16.  124° 24' Haul Road Right-of-Way (part 4) to a pipe;
17.  179° 07' 109.44 feet along Grant 5237 to Hee Fat;
18.  161° 57' 328.20 feet along Lot 3, Kapan Rice and Kula Lots to a
19.  174° 26' pipe;
20.  58° 03' 433.00 feet along Lot 3, Kapan Rice and Kula Lots to a
21.  81° 46' pipe;
22.  195° 34' 278.80 feet along Lot 3, Kapan Rice and Kula Lots to a
23.  134° 25' pipe;
24.  61° 13' 228.00 feet along Lot 3, Kapan Rice and Kula Lots to a
25.  15° 18' pipe;
26.  71° 49' 130.50 feet along Lot 3, Kapan Rice and Kula Lots;
27.  137° 54' 142.10 feet along Lot 3, Kapan Rice and Kula Lots;
28.  196° 07' 37.50 feet along Lot 3, Kapan Rice and Kula Lots;
29.  287° 25' 102.60 feet along Lot 3, Kapan Rice and Kula Lots;
30.  204° 43' 130.60 feet along Lot 3, Kapan Rice and Kula Lots;
31.  191° 23' 37.10 feet along Lot 3, Kapan Rice and Kula Lots;
32.  127° 12' 123.70 feet along Lot 3, Kapan Rice and Kula Lots to a
33.  93° 47' pipe;
34.  139° 40' 168.60 feet along Lot 3, Kapan Rice and Kula Lots to a
35.  187° 18' pipe;
36.  145° 21' 184.30 feet along Lot 3, Kapan Rice and Kula Lots to a
37.  71° 54' pipe;
38.  115° 21' 211.50 feet along Lot 3, Kapan Rice and Kula Lots;
39.  166° 33' 123.70 feet along Lot 3, Kapan Rice and Kula Lots;
40.  216° 24' 92.20 feet along Lot 3, Kapan Rice and Kula Lots;
41.  156° 33' 260.40 feet along Lot 3, Kapan Rice and Kula Lots to a
42.  73° 13' pipe;
43.  122° 08' 340.60 feet along Lot 3, Kapan Rice and Kula Lots to a
44.  150° 30' pipe;
45.  226° 15' 118.03 feet along Lot 3, Kapan Rice and Kula Lots to a
46.  218° 45' pipe; 289.79 feet
to a P.K nail;
47. 211° 17' 44.50 feet along Oholena Road to a P-K nail.

48. Thence along Oholena Road on a curve to the right with a radius of 65.00 feet, the chord azimuth and distance being:
   268° 48' 30" 109.67 feet
   to a pipe.

49. Thence along Oholena Road on a curve to the left with a radius of 87.10 feet, the chord azimuth and distance being:
   299° 32' 78.54 feet
   to a pipe.

50. 272° 44' 249.69 feet along Oholena Road to a pipe.

51. 281° 55' 203.19 feet along Oholena Road to a pipe.

52. 291° 21' 251.40 feet along Oholena Road to a pipe.

53. 261° 28' 149.18 feet along Oholena Road to a pipe.

54. 286° 25' 226.46 feet along Oholena Road to a pipe.

55. 325° 04' 288.93 feet along Oholena Road to a pipe.

56. 317° 06' 310.87 feet along Oholena Road to a pipe.

57. 3° 37' 476.50 feet along Lot 2, Oholena Road widening parcel and Lot 1, Kapaa Intermediate School, and along the remainder of Grant 5266 to Rufus P. Spalding to a pipe.

58. 323° 35' 304.65 feet along Lot 1, Kapaa Intermediate School, and along the remainder of Grant 5266 to Rufus P. Spalding to a pipe.

59. 309° 45' 390.14 feet along Lot 1, Kapaa Intermediate School, and along the remainder of Grant 5266 to Rufus P. Spalding to a pipe.

60. 268° 25' 554.33 feet along Lot 1, Kapaa Intermediate School, and along the remainder of Grant 5266 to Rufus P. Spalding to a pipe.

61. 181° 14' 848.53 feet along Lot 1, Kapaa Intermediate School, and Lot 2, Oholena Road widening Parcel and along the remainder of Grant 5266 to Rufus P. Spalding to a pipe.

62. 257° 37' 127.84 feet along Oholena Road.

63. 297° 22' 265.20 feet along Oholena Road to a pipe.

64. 298° 02' 25.00 feet along Oholena Road to a pipe.

65. Thence along Oholena Road on a curve to the right with a radius of 375.00 feet, the chord azimuth and distance being:
   307° 06' 59" 118.30 feet
   to a pipe.

66. 316° 11' 29.85 feet along Oholena Road to a pipe.

67. 28° 30' 703.12 feet along TMK: 4-4-03-13 and along the remainder of Grant 5266 to Rufus P. Spalding to a pipe.

68. 335° 60' 100.00 feet along TMK: 4-3-03-13 and along the remainder of Grant 5266 to Rufus P. Spalding to a pipe.

69. 301° 35' 130.00 feet along TMK: 4-3-03-13 and along the remainder of Grant 5266 to Rufus P. Spalding to a pipe.

70. 278° 40' 50.00 feet along TMK: 4-3-03-13 and along the remainder of Grant 5266 to Rufus P. Spalding to a pipe.

71. 246° 30' 140.00 feet along TMK: 4-3-03-13 and along the remainder of Grant 5266 to Rufus P. Spalding to a pipe.

72. 316° 11' 110.00 feet along TMK: 4-3-03-13 and along the remainder of Grant 5266 to Rufus P. Spalding to a pipe.
SUBJECT, HOWEVER to an easement for the Temporary Kapaa By-Pass Road Right-of-Way containing an AREA of 7.859 Acres.

ALSO, SUBJECT, HOWEVER to Easements E-1, E-2, E-3 (60.00 ft. wide) and E-4 for electrical transmission lines and poles and containing an area of 79,706 sq. ft., 31,444 sq. ft., 21,431 sq. ft., and 1,947 sq. ft., respectively.

Also subject to a 20 ft. future road widening setback line along Oloheo Road.

WAGNER ENGINEERING SERVICES, INC.

November 13, 1997
P.O. Box 831
Hanalei, Hawaii 96714
8. 290 ° 56'0" 30.00 feet over and across Parcel 1, Tax Map Key 4-3-03 along Kapaa By-Pass Road right-of-way easement;

9. 20 ° 56'0" 331.65 feet over and across Parcel 1, Tax Map Key 4-3-03 along Kapaa By-Pass Road right-of-way easement;

10. 110 ° 50'0" 30.00 feet over and across Parcel 1, Tax Map Key 4-3-03 along Kapaa By-Pass Road right-of-way easement;

11. Thence over and across Parcel 1, Tax Map Key 4-3-03 along Kapaa By-Pass Road right-of-way easement on a curve to the right with a radius of 940.00 feet, the chord azimuth and distance being:
   22 ° 33'0" 53.04 feet;

12. 24 ° 10'0" 136.41 feet over and across Parcel 1, Tax Map Key 4-3-03 along Kapaa By-Pass Road right-of-way easement;

13. Thence over and across Parcel 1, Tax Map Key 4-3-03 along Kapaa By-Pass Road right-of-way easement on a curve to the right with a radius of 940.00 feet, the chord azimuth and distance being:
   20 ° 13'0" 165.49 feet;

14. 34 ° 16'0" 129.33 feet over and across Parcel 1, Tax Map Key 4-3-03 along Kapaa By-Pass Road right-of-way easement;

15. Thence over and across Parcel 1, Tax Map Key 4-3-03 along Kapaa By-Pass Road right-of-way easement on a curve to the right with a radius of 265.00 feet, the chord azimuth and distance being:
   63 ° 01'0" 254.92 feet;

16. 91 ° 46'0" 938.55 feet over and across Parcel 1, Tax Map Key 4-3-03 along Kapaa By-Pass Road right-of-way easement;

17. 91 ° 04'0" 580.00 feet over and across Parcel 1, Tax Map Key 4-3-03 along Kapaa By-Pass Road right-of-way easement;

18. 181 ° 04'0" 10.00 feet over and across Parcel 1, Tax Map Key 4-3-03 along Kapaa By-Pass Road right-of-way easement;

19. 93 ° 59'0" 104.46 feet over and across Parcel 1, Tax Map Key 4-3-03 along Kapaa By-Pass Road right-of-way easement;

20. 179 ° 07'0" 165.42 feet along Lot 3, Kapaa Rice and Kula Lots to a pipe;

21. 161 ° 57'0" 433.00 feet along Lot 3, Kapaa Rice and Kula Lots to a pipe;

22. 174 ° 20'0" 278.80 feet along Lot 3, Kapaa Rice and Kula Lots to a pipe;

23. 273 ° 00'0" 324.19 feet over and across Parcel 1, Tax Map Key 4-3-03;

24. 192 ° 00'0" 193.74 feet over and across Parcel 1, Tax Map Key 4-3-03;

25. 113 ° 12'0" 141.30 feet over and across Parcel 1, Tax Map Key 4-3-03;

26. 225 ° 54'0" 399.65 feet over and across Parcel 1, Tax Map Key 4-3-03;

27. 171 ° 20'0" 478.33 feet over and across Parcel 1, Tax Map Key 4-3-03;

28. 261 ° 20'0" 128.70 feet over and across Parcel 1, Tax Map Key 4-3-03;

29. 233 ° 35'0" 89.98 feet over and across Parcel 1, Tax Map Key 4-3-03;
30.  323° 35’  47.54’ feet along Lot 1, Kapaa Intermediate School;
31.  309° 45’  390.14’ feet along Lot 1, Kapaa Intermediate School;
32.  268° 25’  554.33’ feet along Lot 1, Kapaa Intermediate School;
33.  181° 14’  848.53’ feet along Lot 1, Kapaa Intermediate School, and Lot 2, Oloheha Road widening Parcel;
34.  257° 37’ 127.84’ feet along Oloheha Road;
35.  297° 22’ 265.20’ feet along Oloheha Road to a pipe;
36.  298° 02’ 25.00’ feet along Oloheha Road to a pipe;
37.  Thence along Oloheha Road on a curve to the right with a radius of 375.00 feet, the chord azimuth and distance being: 307° 06’ 30” 118.30’ to a pipe;
38.  316° 11’ 29.85’ feet along Oloheha Road to a pipe;
39.  28° 30’ 203.12’ feet along TMK: 4-3-03-13;
40.  335° 00’ 100.00’ feet along TMK: 4-3-03-13;
41.  301° 35’ 130.00’ feet along TMK: 4-3-03-13;
42.  278° 40’ 50.00’ feet along TMK: 4-3-03-13;
43.  246° 30’ 140.00’ feet along TMK: 4-3-03-13;
44.  316° 11’ 110.00’ feet along TMK: 4-3-03-13;
45.  272° 20’ 46.00’ feet along TMK: 4-3-03-13;
46.  300° 02’ 135.22’ feet along Oloheha Road;
Exhibit J

Botanical Survey
Kapa’a Highlands Phase II
TMK (4) 4-3-003:001
Kaua‘i, Hawai‘i
Botanical Survey
Kapa`a Highlands Phase II
TMK (4) 4-3-003:001
Kaua`i, Hawai`i
April-May
2012

Prepared by

Kenneth R. Wood¹ / Research Biologist
Megan Kirkpatrick / M.S. Environmental Science
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kwood@ntbg.org

TABLE OF CONTENTS

Summary.....................................................3
Study Area.....................................................3
Survey Methods..............................................4
Description of Vegetation.................................4
Conclusion....................................................5
Checklist (Table 1).............................................6
Survey Area (Figure 1 & 2).................................8
References.....................................................9
Summary: During April and May of 2012 a botanical survey was conducted on a 97 acre parcel in Kapa’a, Kaua’i, referred to as Kapa’a Highlands Phase II (TMK (4)3-8-003:001). This research documented 44 vascular plant species within the survey area. Forty taxa were non-native plant species, three taxa were very common indigenous native species, and one taxon was a Polynesian introduction (Table 1). No Federaly Listed as Threatened or Endangered Plant species were observed within or near the survey area. This report includes a general description of the study site; the methods of survey; and a vascular plant checklist of all plant species observed.

STUDY AREA. On April 19, 2012 and May 7, 2012, K. R. Wood (Endangered Species Specialist) and assistant Megan D. Kirkpatrick (M.S. Environmental Science) conducted a biological inventory on an undeveloped parcel of property in Kapa’a, Kaua’i (TMK [4]3-8-003:001) (Figures 1 & 2). The survey area is approximately 97 acres of undeveloped land. The primary objectives of this field survey were to:

a) search for threatened and endangered plant species as well as species of concern;

b) provide a complete vascular plant checklist of both native and non-native plant taxa observed on property; and

c) provide a summary concerning the conservation status of all native taxa observed.

SURVEY METHODS. A walk-through survey method was used. Transects included walking/driving around boundaries of property (TMK (4)3-8-003:001) and several transects through the interior portions of property. Plant identifications were made in the field and were recorded by the author (Table 1). Plant names and authors of dicots and monocots follow Wagner et al. (1990) and pteridophytes follow Palmer (2003). Plants of particular interest were collected by the second author (MK) as herbarium specimen vouchers and deposited at the National Tropical Botanical Garden (NTBG) herbarium. Specimens were placed in newspaper sheets and pressed in-between cardboard herbarium presses and dried at the NTBG.

DESCRIPTION OF VEGETATION.
The study area represents a lowland non-native mesic plant community dominated by secondary vegetation of trees, shrubs, and grasses, many of which are considered invasive. The land is vacant and currently undeveloped and has a past history of grazing and sugarcane cultivation. The non-native grass Panicum maximum (Poaceae – Guinea grass) and non-native shrub or small tree Leucaena leucocephala (Fabaceae – koa haole) are by far the dominant species found at the site. Additional common non-native trees and shrubs include: Lantana camara (Verbenaceae – lākana), Indigofera suffruticosa (Fabaceae – indigo), Syzygium cumini (Myrtaceae – Java plum), Psidium guajava (Myrtaceae – guava), Spathodea campanulata (Bignoniaceae – African tulip), and Senna surattensis (Fabaceae – kolomona). Several less common non-native trees and shrubs include: Clidemia hirta (Melastomataceae – Koster’s curse), Cinnamomum camphora (Lauraceae – camphor tree), Falcataria moluccana (Fabaceae – albezia), Ficus microcarpa (Moraceae – Chinese banyan), and Schefflera actinophylla (Araliaceae – octopus tree). No Hawaiian endemic species (i.e., restricted to only Hawai‘i) were observed. One Polynesian introduction was observed, namely Aleurites moluccana (Euphorbiaceae – kukui tree) which is common throughout the Hawaiian islands. The three indigenous species found at the site are quite common and include: Hibiscus tiliaceus (Malvaceae – hau), and Waltheria indica (Sterculiaceae – ‘uhaloa). For complete checklist of species see Table 1 which also includes the common names and status (i.e., indigenous/naturalized) category of each taxon.
CONCLUSION.
NO THREATENED OR ENDANGERED PLANT SPECIES WERE OBSERVED WITHIN OR ANYWHERE NEAR THE SURVEY AREA DURING RESEARCH -and therefore there are no concerns about possible impacts to rare plant species at the Kapa`a Highlands Phase II project.

The current conditions of this study site indicate that the area has been dominated by non-native weedy species for a very long time. The senior author certifies his expertise with more than 25 years conducting biological inventories within the Hawaiian Islands and has specialized in the conservation of Hawai`i’s Federally Listed as Endangered plant species, including those considered Candidates for listing, Species of Concern, or Federally Listed as Threatened (USFWS 1999a, 1999b, 2004, 2010).

### TABLE 1. Checklist of Vascular Plants Observed in Kapa`a Highlands Phase II Survey Area (TMK (4) 4-3-003:001)

<table>
<thead>
<tr>
<th>FAMILY</th>
<th>GENUS / SPECIES</th>
<th>COMMON NAME</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asparagaceae</td>
<td>Agave sisalana Perrine</td>
<td>sisal, sisal hemp, century plant, malina</td>
<td>nat</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Ageratum conyzoides L.</td>
<td>maile hohono, maile honohono, maile kula</td>
<td>nat</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Aleurites moluccana (L.) Willd.</td>
<td>kukui, kuikui, candlenut</td>
<td>pol</td>
</tr>
<tr>
<td>Blechnaceae</td>
<td>Blechnum appendiculatum Wild.</td>
<td></td>
<td>nat</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Brachiaria mutica (Forsk.) Stapf</td>
<td>California grass, Para grass</td>
<td>nat</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Canavalia cathartica Thouars</td>
<td>mauanaka</td>
<td>nat</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Chamaecrista nictitans (L.) Moench var. glabrata (Vogel) H. S. Irwin &amp; Barneby</td>
<td>partridge pea, lauk/g431</td>
<td>nat</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Chloris barbata (L.) Sw.</td>
<td>swollen fingergrass, mau'u lei</td>
<td>nat</td>
</tr>
<tr>
<td>Lauraceae</td>
<td>Cinnamomum camphora (L.) J.Presl</td>
<td>camphor tree</td>
<td>nat</td>
</tr>
<tr>
<td>Melastomataceae</td>
<td>Clidemia hirta (L.) D.Don</td>
<td>Koster's curse</td>
<td>nat</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Cyanthillium cinereum (L.) H. Rob.</td>
<td>little ironweed</td>
<td>nat</td>
</tr>
<tr>
<td>Thelypteridaceae</td>
<td>Cyclosorus dentatus (Forsk.) Ching</td>
<td>p'ai'hā</td>
<td>nat</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Cydonia dactylon (L.) Pers.</td>
<td>Bermuda grass, mānienie</td>
<td>nat</td>
</tr>
<tr>
<td>Cyperaceae</td>
<td>Cyperus plicatus Vahl</td>
<td></td>
<td>nat</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Eragrostis brownii (Kurth) Nees ex Steud.</td>
<td>sheepgrass</td>
<td>nat</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Falcataria moluccana (Miq.) Barneby &amp; J.W.Grimes</td>
<td></td>
<td>nat</td>
</tr>
<tr>
<td>Moraceae</td>
<td>Ficus microcarpa L.f.</td>
<td>Chinese banyan, Malay banyan</td>
<td>nat</td>
</tr>
<tr>
<td>Cyperaceae</td>
<td>Fimbristylis miliacea (L.) Vahl</td>
<td></td>
<td>nat</td>
</tr>
<tr>
<td>Malvaceae</td>
<td>Hibiscus tiiliaceus L.</td>
<td>hau</td>
<td>ind</td>
</tr>
<tr>
<td>Lamiaceae</td>
<td>Hyptis pectinata (L.) Poit.</td>
<td>comb hyptis</td>
<td>nat</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Indigofera suffruticosa Mill.</td>
<td>indigo, inika, inkoa, kōlū</td>
<td>nat</td>
</tr>
<tr>
<td>Verbenaceae</td>
<td>Lantana camara L.</td>
<td>i<code>akana, i</code>au kalakula, lanakana (Ni`ihau)</td>
<td>nat</td>
</tr>
<tr>
<td>FAMILY</td>
<td>GENUS / SPECIES</td>
<td>COMMON NAME</td>
<td>STATUS</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------------------</td>
<td>--------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Leucaena leucocephala (Lam.) de Wil</td>
<td>koa haole, êkoa, lilikoa</td>
<td>nat</td>
</tr>
<tr>
<td>Malvaceae</td>
<td>Malvastrum coronandellum (L.) Garcke</td>
<td>false mallow</td>
<td>nat</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Melinis repens (Wild.) Zizka</td>
<td>Natal redtop, Natal grass</td>
<td>nat</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Mimosa pudica L.</td>
<td>sensitive plant, sleeping grass, pua hilahia</td>
<td>nat</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Neomotonia wightii (Wight &amp; Arn.) Verdc.</td>
<td></td>
<td>nat</td>
</tr>
<tr>
<td>Lomariopsidaceae</td>
<td>Nephrolepis brownii (Desv.) Hovenkamp &amp; Miyam.</td>
<td></td>
<td>nat</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Panicum maximum Jacq.</td>
<td>Guinea grass</td>
<td>nat</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Parthenium hysterophorus L.</td>
<td>false ragweed, Santa Maria</td>
<td>nat</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Pluchea carolinensis (Jacq.) G.Don</td>
<td>sourbush, marsh fleabane</td>
<td>nat</td>
</tr>
<tr>
<td>Myrtaceae</td>
<td>Psidium guajava L.</td>
<td>common guava, kuawa</td>
<td>nat</td>
</tr>
<tr>
<td>Psilotaceae</td>
<td>Psilotum nudum (L.) P.Beauv.</td>
<td>moa, moa nahele</td>
<td>ind</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Ricinus communis L.</td>
<td>castor bean, pã<code>a</code>ila</td>
<td>nat</td>
</tr>
<tr>
<td>Araliaceae</td>
<td>Schefflera actinophylla (Endl.) Harms</td>
<td>octopus tree, umbrella tree</td>
<td>nat</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Schizostachyum sp.</td>
<td>`ohe</td>
<td>nat</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Senna surattensis (Burm.f.) H.S.Irwin &amp; Barneby</td>
<td>kolomona, kalamona</td>
<td>nat</td>
</tr>
<tr>
<td>Malvaceae</td>
<td>Sida spinosa L.</td>
<td>prickly sida</td>
<td>nat</td>
</tr>
<tr>
<td>Bignoniaceae</td>
<td>Spathodea campanulata P.Beauv.</td>
<td>African tulip tree, fountain tree</td>
<td>nat</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Sphaenactinocila triloabata (L.) Pruski</td>
<td>wedelia</td>
<td>nat</td>
</tr>
<tr>
<td>Verbenaceae</td>
<td>Stachytarpheta jamaicensis (L.) Vahl</td>
<td>Jamaica vervain, Ñwili</td>
<td>nat</td>
</tr>
<tr>
<td>Myrtaceae</td>
<td>Syzygium cumini (L.) Skeels</td>
<td>Java plum, jambojan plum</td>
<td>nat</td>
</tr>
<tr>
<td>Acanthaceae</td>
<td>Thunbergia fragrans Roxb.</td>
<td>white thunbergia, sweet clock-vine</td>
<td>nat</td>
</tr>
<tr>
<td>Sterculiaceae</td>
<td>Waltheria indica L.</td>
<td><code>uhaloa, </code>ala<code>ala </code>u loa</td>
<td>ind</td>
</tr>
</tbody>
</table>
REFERENCES


Biological Surveys Conducted on the Kapa’a Highlands Phase II Project Site, TMK: (4)-3-003:001, Island of Kaua’i, Hawai’i

Prepared by:
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Prepared for:
Greg Allen
Kapa’a Highlands

May 24, 2012

Table of Contents

EXECUTIVE SUMMARY ........................................................................................................... 3
INTRODUCTION AND BACKGROUND .................................................................................. 5
GENERAL SITE DESCRIPTION ................................................................................................. 5
METHODS ................................................................................................................................ 8
BOTANICAL SURVEY METHODS ......................................................................................... 8
AVIAN SURVEY METHODS ................................................................................................... 8
MAMMALIAN SURVEY METHODS ....................................................................................... 8
RESULTS ................................................................................................................................. 9
BOTANICAL SURVEY ............................................................................................................ 9
AVIAN SURVEY RESULTS .................................................................................................... 9
MAMMALIAN SURVEY RESULTS ......................................................................................... 9
DISCUSSION ............................................................................................................................ 11
AVIAN RESOURCES .............................................................................................................. 11
MAMMALIAN RESOURCES ................................................................................................. 12
POTENTIAL IMPACTS TO PROTECTED SPECIES .............................................................. 12
BOTANICAL ......................................................................................................................... 12
SEABIRDS ............................................................................................................................. 12
HAWAIIAN HOARY BAT ...................................................................................................... 12
CRITICAL HABITAT .............................................................................................................. 13
RECOMMENDATIONS ......................................................................................................... 13
GLOSSARY ............................................................................................................................. 14
LITERATURE CITED ............................................................................................................. 15
APPENDIX A .......................................................................................................................... 19
Executive Summary

Biological field surveys were conducted on an approximately 97-acre parcel of land identified as Tax Map Key (4) 3-8-003:001 located in Kapa'a, Island of Kaua'i. The owners are proposing to develop these lands as Phase II of the Kapa'a Highlands subdivision.

The primary purpose of the surveys was to determine if there are any botanical, avian and terrestrial mammalian species currently listed, or proposed for listing under either federal or State of Hawai'i endangered species statutes within or adjacent to the study area. The avian and mammalian surveys were conducted May 21, 2012, and the botanical survey was conducted on April 19 and May 7, 2012.

No species currently proposed or listed as threatened or endangered under either the federal or State of Hawaii endangered species statutes was documented during the course of the biological surveys conducted on the subject property in April and May, 2012.

There is no federally delineated Critical Habitat for any species present on or adjacent to the project area. Thus the development and operation of the proposed project will not result in impacts to federally designated Critical Habitat. There is no equivalent statute under State law.

Potential Impacts to Protected Species

Botanical

As all of the plant species recorded are either naturalized species or common indigenous species it is not expected that the development and operation of the proposed subdivision will result in deleterious impacts to any botanical species currently listed or proposed for listing under either federal or State of Hawai'i endangered species statutes.

Seabirds

The principal potential impact that construction and operation of the Kapa'a Highlands Phase II project poses to protected seabirds is the increased threat that birds will be downed after becoming disoriented by lights associated with the project during the nesting season. The two main ways that outdoor lighting could pose a threat to these nocturnally flying seabirds is if (1) during construction it is deemed expedient, or necessary to conduct nighttime construction activities, and 2) following build-out, the potential operation of streetlights and exterior safety and security lighting.

Hawaiian hoary bat

The principal potential impact that the development of the Kapa'a Highlands Phase II project poses to bats is during the clearing and grubbing phases of construction as vegetation is removed. The removal of vegetation within the project site may temporarily displace individual bats, which may use the vegetation as a roosting location. As bats use multiple roosts within their home territories, the potential disturbance resulting from the removal of the vegetation is likely to be minimal. During the pupping season, females carrying their pups may be less able to rapidly vacate a roost site as the vegetation is cleared. Additionally, adult female bats sometimes leave their pups in the roost tree while they forage. Very small pups may be unable to flee a tree that is being felled. Potential adverse effects from such disturbance can be avoided or minimized by not clearing woody vegetation taller than 4.6 meters (15-feet), between June 15 and September 15, the period in which bats are potentially at risk from vegetation clearing.
Introduction and Background

An avian and mammalian survey was conducted on an approximately 97-acre parcel of land identified as Tax Map Key 4-3-8-003-001 located in Kapa’a, Island of Kaua‘i (Figure 1). The owners are proposing to develop these lands as Phase II of the Kapa’a Highlands subdivision.

This report describes the methods used and the results of the avian and terrestrial mammalian surveys conducted on the project site by this author and a summary of the results of the botanical surveys conducted on the site by Wood and Kirkpatrick (2012). Both surveys were conducted as part of the environmental disclosure process associated with the proposed project.

The primary purpose of the surveys was to determine if there are any botanical, avian and terrestrial mammalian species currently listed, or proposed for listing under either federal or State of Hawai‘i endangered species statutes within or adjacent to the study area. The federal and State of Hawai‘i listed species status follows species identified in the following referenced documents, (Department of Land and Natural Resources (DLNR) 1998; U.S. Fish & Wildlife Service (USFWS) 2005, 2012). The avian and mammalian surveys were conducted May 21, 2012, and the botanical survey was conducted on April 19 and May 7, 2012.

Hawaiian and scientific names are italicized in the text. A glossary of technical terms and acronyms used in the document, which may be unfamiliar to the reader, are included at the end of the narrative text.

General Site Description

The approximately 97 acre project site is bound to the north by Oloheana Road (SR 581) and Kapa’a Middle School, to the east and south by the Kapa’a Bypass Road and to the west by undeveloped land and a new solar power generating facility (Figure 1). The site is made up of gently rolling hills that attain a maximum elevation of ~ 45 meters above mean sea level in the northwestern corner, sloping makai in an east-southeast direction down to an elevation of approximately ~ 6 meters ASL at the intersection of Oloheana Road and the Kapa’a Bypass Road.

The site has a long history of sugar cultivation, followed by use as cattle pastureage. The vegetation currently on the site is dominated almost to the exclusion of native species by Guinea grass (Panicum maximum), kuo hoole (Leucacera leucopetala), la‘ilani (Lantana camara), with Java plum trees (Syzygium cumini), dotted across the landscape (Figure 2). The southwestern boundary of the site has fairly dense stands of hau (Hibiscus tiliaceus) along the boundary (Figure 3).

1 Wood, K.R., and M. Kirkpatrick. 2012. Botanical Survey Kapa’s Highlands Phase II TMK (4) 4-3-8-003:001 Kaua‘i, Hawai‘i April-May 2012, is appended to this document as Appendix A.
Methods


Botanical Survey Methods

The botanical survey was conducted using a pedestrian (walking) transect methodology to cover the project area. Wood and Kirkpatrick’s methodologies are detailed in Appendix A.

Avian Survey Methods

A total of six avian point count stations were sited roughly equidistant from each other within the project site. Six minute point counts were made at each of the count stations. Each station was counted once. Field observations were made with the aid of Leica 8 X 42 binoculars and by listening for vocalisations. Points counts were concentrated during the early morning hours, the peak of daily bird activity. Time not spent counting was used to search the remainder of the project site for species and habitats that were not detected during count sessions.

Mammalian Survey Methods

With the exception of the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), or 'ōpōpe'a as it is known locally, all terrestrial mammals currently found on the Island of Kaua‘i are alien species, and most are ubiquitous. The survey for terrestrial mammalian species was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign. No trapping program or heterodyne bat detection survey methods were used during the course of this survey. A running tally was kept of all terrestrial vertebrate mammalian species detected within the project area during time spent within the project site.
Results

Botanical Survey

A total of 44 species of vascular plants were identified from the survey area. Three of the species detected moa (Pilorum nutum), hau (Hibiscus tiliaeaceus) and ‘ubaha (Waltheria indica) are common indigenous species in the Islands. One species kukui (Aleurites moluccana) is a Polynesian introduction (Wood and Kirkpatrick, 2012).

Wood and Kirkpatrick did not detect any botanical species currently listed as endangered or threatened under either federal or State of Hawai’i endangered species statutes. For a detailed description of their findings please see Appendix A.

Avian Survey Results

A total of 193 individual birds of 17 species, representing 13 separate families, were recorded during station counts (Table 1). All 17 species recorded are alien to the Hawaiian Islands (Table 1).

Avian diversity and densities were in keeping with the location of the property and the habitat presently on the site. Four species, House Finch (Carpodacus mexicanus), Nutmeg Mannikin (Lonchura punctulata), Japanese White-eye (Zosterops japonicus) and Zebra Dove (Geopelia striata) accounted for slightly more than 45 percent of all birds recorded during station counts. The most commonly recorded species was House Finch, which accounted for 14 percent of the total number of individual birds recorded. An average of 32 individual birds was recorded per station count; a number that is about average for point counts in this area on the Island of Ka‘a‘i.

No avian species currently proposed or listed under either the State of Hawai‘i or federal endangered species statutes was detected during the course of this survey, nor would they be expected given the habitat currently present on the site.

Mammalian Survey Results

Four terrestrial mammalian species were detected while on the site. Numerous dogs (Canis f. familiaris) were heard barking from areas adjacent to the site. Tracks and scat of pig (Sus scrofa) were encountered within the site. Tracks, and scat of both horse (Equus c. caballus) and cow (Bos taurus), were also encountered within the site.

Table 1 – Avian Species Kapa’a Highlands Phase II Point Counts

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>ST</th>
<th>RA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Junglefowl</td>
<td>Gallus gallus</td>
<td>A</td>
<td>1.50</td>
</tr>
<tr>
<td>Cattle Egret</td>
<td>Bubulcus ibis</td>
<td>A</td>
<td>0.83</td>
</tr>
<tr>
<td>Spotted Dove</td>
<td>Streptopelia chinensis</td>
<td>A</td>
<td>2.00</td>
</tr>
<tr>
<td>Zebra Dove</td>
<td>Geopelia striata</td>
<td>A</td>
<td>2.67</td>
</tr>
<tr>
<td>Japanese Bush-Warbler</td>
<td>Gettis diphone</td>
<td>A</td>
<td>1.17</td>
</tr>
<tr>
<td>Japanese White-eye</td>
<td>Zosterops japonicus</td>
<td>A</td>
<td>1.17</td>
</tr>
<tr>
<td>Chinese Hwamei</td>
<td>Garrulax canorus</td>
<td>A</td>
<td>0.50</td>
</tr>
<tr>
<td>White-rumped Shama</td>
<td>Cogypoculus malabruci</td>
<td>A</td>
<td>1.17</td>
</tr>
<tr>
<td>STURIDAE - Starlings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common Myna</td>
<td>Acridotheres trius</td>
<td>A</td>
<td>2.50</td>
</tr>
<tr>
<td>Red-crested Cardinal</td>
<td>Paroaria coronata</td>
<td>A</td>
<td>1.00</td>
</tr>
<tr>
<td>Northern Cardinal</td>
<td>Cardilinix cardilinix</td>
<td>A</td>
<td>1.67</td>
</tr>
<tr>
<td>Western Meadowlark</td>
<td>Sturnella neglecta</td>
<td>A</td>
<td>0.67</td>
</tr>
<tr>
<td>House Finch</td>
<td>Carpodacus mexicanus</td>
<td>A</td>
<td>4.50</td>
</tr>
<tr>
<td>ESTRIDIDAE - Estrilds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Avadavat</td>
<td>Amandava amandava</td>
<td>A</td>
<td>0.56</td>
</tr>
<tr>
<td>Nutmeg Mannikin</td>
<td>Lonchora punctulata</td>
<td>A</td>
<td>4.33</td>
</tr>
<tr>
<td>Java Sparrow</td>
<td>Padda eryzitora</td>
<td>A</td>
<td>1.33</td>
</tr>
</tbody>
</table>

Key to Table 1

ST Status
A Alien – Introduced to the Hawaiian Islands by humans
RA Relative Abundance – Number of birds detected divided by the number of count stations (6)
Discussion

Botanical Resources

Only nine percent of the plant species (~4/44) detected on the subject property were either indigenous or early Polynesian introductions. This proportion is remarkably low for lowland areas on Kaua‘i, and graphically illustrates the highly disturbed and depauperate nature of the native vegetation present on this site. Please see Appendix A for a more detailed discussion of the botanical resources present on the site.

Avian Resources

The findings of the avian survey are consistent with the location of the property, and the habitat present on the site. As previously stated all of the avian species detected during the course of this survey are alien to the Hawaiian Islands.

Although not detected during this survey, the endangered Hawaiian Petrel (Pterodroma sandwichiana), and the threatened endemic subspecies of the Newell’s Shearwater (Puffinus auricularis newelli) have been recorded over-flying the project site between April and the end of November each year (David, 1995; Morgan et al., 2003, 2004; David and Planning Solutions 2008). Additionally, the Save Our Shearwaters Program has recovered both species from the general project area on an annual basis over the past three decades (Morgan et al., 2003, 2004; David and Planning Solutions, 2008; Save our Shearwater Program, 2012).

The petrel is listed as endangered, and the shearwater as threatened under both Federal and State of Hawaii endangered species statutes. The primary cause of mortality in both Hawaiian Petrels and Newell’s Shearwaters is thought to be predation by alien mammalian species at the nesting colonies (USFWS 1983, Simons and Hodges 1998, Ainley et al., 2001). Collision with man-made structures is considered to be the second most significant cause of mortality of these seabird species in Hawaii. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. When disoriented, seabirds can collide with manmade structures, and if they are not killed outright, the dazed or injured birds are easy targets of opportunity for feral mammals (Hadley 1961; Telfer 1979; Sincok 1981; Reed et al., 1985; Telfer et al., 1987; Cooper and Day, 1998; Podolsky et al. 1998; Ainley et al., 2001; Hue et al., 2001; Day et al. 2003). There are no nesting colonies or appropriate nesting habitat for either of these listed seabird species within the current study site.

Following build out it is probable that cleared areas, especially those that are landscaped as lawns, and or parking lots will provide loafing habitat for Pacific Golden-Flower (Pluvialis fulva). The glover is an indigenous migratory shorebird species which nests in the high Arctic during the late spring and summer months, returning to Hawaii and the Tropical Pacific to spend the fall and winter months each year. They usually leave Hawaii for their trip back to the Arctic in late April or the very early part of May each year. This species is a common site around the state during the late fall and winter months.

Mammalian Resources

The findings of the mammalian survey are consistent with the location of the property and the habitat currently present on the site. We did not record Hawaiian hoary bats overflying the site. Hawaiian hoary bats are widely distributed in the lowland areas on the Island of Kaua‘i, and have been documented in and around almost all areas that still have some dense vegetation (Tomich, 1986; USFWS 1998, David, 2012).

Although no rodents were detected during the course of this survey, it is virtually certain one or more of the four established alien muridae found on Kaua‘i, roof rat (Rattus r. rattus), Norway rat (Rattus norvegicus), European house mouse (Mus musculus domesticus) and possibly Polynesian rats (Rattus exulans hawaiensis) use various resources found within the general project area. All of these introduced rodents are deleterious to native ecosystems and the native fauna species dependant on them.

Potential Impacts to Protected Species

Botanical

As all of the plant species recorded are either naturalized species or common indigenous species it is not expected that the development and operation of the proposed subdivision will result in deleterious impacts to any botanical species currently listed or proposed for listing under either Federal or State of Hawaii’s endangered species statutes.

Seabirds

The principal potential impact that construction and operation of the Kapa’a Highlands Phase II project poses to protected seabirds is the increased threat that birds will be downed after becoming disoriented by lights associated with the project during the nesting season. The two main ways that outdoor lighting could pose a threat to these nocturnally flying seabirds is if 1) during construction it is deemed expedient, or necessary to conduct nighttime construction activities, and 2) following build-out, the potential operation of streetlights and exterior safety and security lighting.

Hawaiian hoary bat

The principal potential impact that the development of the Kapa’a Highlands Phase II project poses to bats is during the clearing and grubbing phases of construction as vegetation is removed. The removal of vegetation within the project site may temporarily displace individual bats, which may use the vegetation as a roosting location. As bats use multiple roosts within their home territories, the potential disturbance resulting from the removal of the vegetation is likely to be minimal. During the pupping season, females carrying their pups may be less able to rapidly vacate a roost site as the vegetation is cleared. Additionally, adult female bats sometimes leave their pups in the roost tree while they forage. Very small pups may be unable to flee a tree that is being felled. Potential
adverse effects from such disturbance can be avoided or minimized by not clearing woody vegetation taller than 4.6 meters (15-feet), between June 15 and September 15, the period in which bats are potentially at risk from vegetation clearing.

**Critical Habitat**

There is no federally delineated Critical Habitat for any species present on or adjacent to the project area. Thus the development and operation of the proposed project will not result in impacts to federally designated Critical Habitat. There is no equivalent statute under State law.

**Recommendations**

- All exterior lights installed in conjunction with the proposed project should be shielded to reduce the potential for interaction of nocturnally flying seabirds with external lights and man-made structures (Reed et al, 1985; Tefer et al, 1987). Any lighting fixtures that meet the “Dark Skies” guidelines are appropriate.

- It is recommended that woody vegetation taller than 4.6 meters (15-feet), not be cleared between June 1 and September 15, the period in which bats are potentially at risk from vegetation clearing.

- It is recommended that, where appropriate and practicable, native plant species be used in landscaping efforts. Not only is this ecologically prudent, but also if the appropriate plants are used, it will also likely save maintenance and water costs over the long term.

**Glossary**

- **Alien** – Introduced to Hawai’i by humans
- **Commensal** – Animals that share human food and lodgings, such as rats, mice cats and dogs.
- **Crepuscular** – Twilight hours
- **Endangered** – Listed and protected under the Endangered Species Act of 1973, as amended (ESA) as an endangered species
- **Endemic** – Native to the Hawaiian Islands and unique to Hawai’i
- **Indigenous** – Native to the Hawaiian Islands, but also found elsewhere naturally
- **Mukau** – Down-slope, towards the ocean
- **Muridae** – Rodents, including rats, mice and voles, one of the most diverse families of mammals
- **Naturalized** – A plant or animal that has become established in an area that it is not indigenous to
- **Nocturnal** – Night-time, after dark
- **‘Ope’ape’a** – Endemic endangered Hawaiian hoary bat (Lasiurus cinereus semotus)
- **Pelagic** – An animal that spends its life at sea – in this case seabirds that only return to land to nest and rear their young
- **Phylogenetic** – The evolutionary order that organisms are arranged by
- **Ruderal** – Disturbed, rocky, rubbishy areas, such as old agricultural fields and rock piles
- **Sign** – Biological term referring to tracks, scat, rubbing, odor, marks, nests, and other signs created by animals by which their presence may be detected
- **Threatened** – Listed and protected under the ESA as a threatened species
- **ASL** – Above mean sea level
- **DLNR** – Hawai’i State Department of Land & Natural Resources
- **DOFAW** – Division of Forestry and Wildlife
- **ESA** – Endangered Species Act of 1973, as amended
- **TMK** – Tax Map Key
- **USFWS** – United States Fish & Wildlife Service
Literature Cited


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Kapa’s Highlands Phase II Biological Surveys - 2012 15

Kapa’s Highlands Phase II Biological Surveys - 2012 16


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Appendix A

TMK (4) 4-3-003:001
Kaua‘i, Hawai‘i April-May 2012.

Exhibit L

An Archaeological Assessment for the Proposed Kapa`a Highlands Phase II Project
Kapa`a Ahupua`a, Kawaihau, Kaua`i
March 31, 2014

Nancy McMahon
Exploration Associates, Limited
3-2600 Kaumualii Highway, Suite 1300, PMB 306
Līhu‘e, HI 96766

Dear Ms. McMahon:

SUBJECT: Chapter 6E-42 Historic Preservation Review – Archaeological Assessment for the Kapa‘a Highlands Phase II Project
Kapa‘a Ahupua‘a, Kawaihau District, Island of Kaua‘i
TMK: (4) 4-3-003:001

Thank you for the opportunity to review the revised draft reports titled An Archaeological Assessment with Subsurface Testing for the Proposed Kapa‘a Highlands Phase II Project, Kawaihau District, Kaua‘i TMK: (4) 4-3-003:001 (McMahon and Tolleson). We received the first revised draft on September 27, 2013 (Log No. 2013.5628), the second on January 2014 (Log No. 2014.00035), and final revisions, including Figure 9, on March 26, 2014. SHPD made several requests that an archaeological inventory survey including subsurface testing be conducted on the property due to the identification of historic properties on nearby parcels including TMK: (4) 4-3-003:004, 005 (June 28, 2010, Log No. 2010.2441, Doc. No. 1006MV50; and October 1, 2012, Log No. 2012.1541, Doc. No. 1209SL24). The current AIS yielded no historic properties and was re-designated an archaeological assessment pursuant to Hawai‘i Administrative Rules (HAR) §13-284-5.

The archaeological inventory survey (AIS) was conducted on behalf of Three Stooges LLC in support of a residential subdivision development on a 97-acre property. The AIS involved a 100% pedestrian survey and subsurface testing consisting of excavation of three backhoe trenches. No previously- or newly-identified historic properties were documented in the project area. The project area was assessed as having been extensively subjected to sugar cane plantation agriculture and to now be void of any surface plantation architecture or infrastructure remnants and to lack evidence of subsurface cultural deposits below the agricultural zone.

The revisions adequately address the issues and concerns raised in our earlier correspondence (October 1, 2012; Log No. 2012.1541, Doc. No. 1209SL24) and in our consultations. The revised report provides adequate discussion of the project location, environs, cultural and historical background, previous investigations, field methods, and findings. The report meets the standards set forth in HAR §13-276-5. It is accepted by SHPD. Please send one hardcopy of the document, clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF version on CD to the Kapolei SHPD office, attention SHPD Library.

Please contact me at (808) 692-8019 or Susan.A.Lebo@hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,

Susan A. Lebo, PhD
Oahu Lead Archaeologist
An Archaeological Assessment
With Subsurface Testing for the
Proposed Kapa`a Highlands Phase II Project, Kapa`a Ahupua`a, Kawaihau, Kaua`i
TMK (4) 4-3-3: 1

By
Nancy McMahon, M.A. and Wendy Tolleson, M.A.

Prepared for:
Three Stooges LLC

Exploration Associates, Ltd
Revised September 2013
LIST OF FIGURES

Figure 1. USGS Map of the Project Area. 2
Figure 2. Project location and surveyed area outlined in purple. 3
Figure 3. Project development map. 3
Figure 4. Aerial View of the Kapa‘a Highlands Phase II Looking West. 4
Figure 5. Aerial View of the Kapa‘a Highlands Phase II Looking Mauka. 4
Figure 6. Map showing previous archaeological studies in Kapa‘a. 17
Figure 7. Map of previously documented archaeological sites in Kapa‘a. 21
Figure 8. Trench locations. 23
Figure 9. Profile Test Trench 2 on left and Trench 3 on right 24
Figure 10. Entrance off Olohena Road looking Makai the Solar Farm in the Distance 24
Figure 11. Remnant Road with Cattle Grazing in the Distance. 25
Figure 12. Lower Elevation Outside Area from the Access Road. 26
Figure 13. View Across the Project Area, Facing Makai and Northeast. 27
Figure 14. Looking at the Roof of Kapa‘a Middle School. 28
APPENDIX A

Figure 1. View of Project Area from the gate at the top of Olohena Road. 36
Figure 2. Solar Farm and Equipment Buildings 37
Figure 3. Cattle Grazing in the Project Area 37
Figure 4. Fence in the left side of photo indicating property boundary 38
Figure 5. Goats Grazing in the Project Area. 39

LIST OF TABLES

Table 1. Heiau of Kapa‘a 9
Table 2. Mahele Land Claims in Kapa‘a Ahupua‘a 10
Table 3. Previous Archaeological Studies in Kapa‘a 15
Table 4. Historic Properties in Kapa‘a Ahupua‘a 18

EXPLORATION ASSOCIATES LTD

INTRODUCTION

Project Background

At the request of Three Stooges LLC., Exploration Associates Ltd. (EAL) conducted an archaeological assessment of a parcel of land (referred to hereafter as Kapa‘a Highlands Phase II) in Kapa‘a (in TMK 4-3-3:1) (Figures 1 & 2). The survey was performed to address any historic preservation or cultural impact issues that might affect the proposed development.

The proposed development, Kapa‘a Highlands Phase II, project involves the development of a residential subdivision on a 97 acre parcel. Approximately 69 acres will be subdivided into residential lots both single family and multi-family units. In addition the breakdown of Phase II will include: roads - 9.4 acres; church - 0.8 acres; general commercial - 0.4 acres; parks - 3.1 acres and open space - 14.3 acres.

Scope of Work

The purpose of this archaeological investigation is to address any archaeological and/or historical concerns. The proposed work includes a surface survey, subsurface testing, and a report detailing methods and any finds. This archaeological work meets the requirements of an inventory-level survey per the rules and regulations of (State Historic Preservation Division/Department of Land and Natural Resources) SHPD/DLNR. The level of work is sufficient to address site types, locations, and allow for future mitigation recommendations if appropriate. Any property over 50 years of age must be evaluated for historic Significance on the National Register of Historic places, and include remnant pr-contact and historic period site.

The scope of work includes:

- Historical research includes study of archival sources, historic maps, Land Commission Awards and previous archaeological reports to construct a history of land use and to determine if archaeological sites have been recorded on or near this property.
- Pedestrian survey of 100% of the subject parcel to identify any surface archaeological features and investigate and assess the potential for impact to such sites, and limited subsurface testing to identify any subsurface sensitive areas that may require further investigation or mitigation before the project proceeds.
- Preparation of a report which will include the results of the historical research and the fieldwork with an assessment of archaeological potential based on that research with recommendations for further archaeological work, if appropriate. It also will provide mitigation recommendations if there are archaeologically sensitive areas that require further consideration.
Figure 1. USGS Map Showing Project Area

Figure 2. Project location and surveyed area outlined in purple.

Figure 3. Project development map.
Methods

On January 3, 2012 and April 25, 2012 and November 11, 2012 a survey of the Kapa’a Highlands Phase II project area was conducted by Exploration Associates Ltd. by archaeologist Nancy McMahon, M.A. Survey transects oriented north-south were spaced 10 m. apart where possible through thick guinea grass. Field observations were recorded and photographs were taken of the project area, the surrounding area, and the backhoe trenches. Three test trenches were machine excavated to examine the soils and determine if any stratigraphy or buried cultural deposits was present. Soils were classified using a Munsell color chart, then photographed.

Historical research includes a review of previous archaeological studies on file at the State Historic Preservation Division of the Department of Land and Natural Resources; studies of documents at Hamilton Library UH Manoa, the Kapa’a and Lihue Public Libraries, the Kaua‘i Museum, the Kaua‘i Historical Society and from the study of maps at the Survey Office of the Department of Land and Natural Resources. Nineteenth-century Land Commission Award claim records were accessed via the Internet from the Mahele Database prepared by Waihona ‘Aina Corp.

Natural Setting/Project Area

The subject parcel is located north of Kapa’a town on former cane lands situated on a bluff adjacent to the coastal plain. It is bordered by Olohena Road to the north and the Kapa’a Bypass Road on the south and east. Kapaa Intermediate School is located on state land near the middle of the northern portion of the property. A Phase I parcel has an existing solar farm and equipment building.

The southern border of the project area is adjacent to the by-pass road within an elevation of approximately 55 feet above msl. The topography of the project area rises in elevation to the northern border approximately 130 feet above msl or an average increase of less than 5%. There are particular areas of the property with 20% slopes. The project area is currently fallow and is vegetated with Guinea Grass (Panicum maximum), Koa Haole (Leucaena leucocephala), and Java Plum (Syzygium cumini). The last cultivation of sugar cane on the project area was 15 years ago, but due to the poor soil, strong trade winds and the salt spray from the ocean, the viability of agricultural crops is limited. Solar farming, goat and cattle grazing are the current utilization of the property.

Foote et al (1972) described the soil in this area as Lihue-Puhi association, deep, nearly level to steep, well drained soils with fine texture and moderately fine texture subsoil. Permeability is moderately rapid, run-off is slow and erosion hazard is slight. The mean annual rainfall throughout the study area is about 22 inches per year. Average temperatures in the region range from the 60s to the low 90s, Fahrenheit. Temperature differences between day and night are about 15 degrees. The consistent direction of the tradewinds is from the northeast at between 10 and 15 miles per hour.
HISTORICAL BACKGROUND

From Puna District to Kawaihau District

The ahupua`a of Kapa`a belongs in the ancient district of Puna, one of five ancient districts on Kaua`i (King 1935: 228). Puna was the second largest district on Kaua`i, behind Kona, and extended from Kipu, south of Lihue to Kama`oma`o`o, just north of Kealia. For taxation, educational and judicial reasons, new districts were created in the 1840s. The Puna District, with the same boundaries became the Lihu`e District, named for an important town in that district. In 1878, King Kalakau`a in securing a future name for the new district created the new district of Kawaihau. This new district encompassed the ahupua`a ranging from Olohena on the south to Kilauea on the north. Subsequent alterations to district boundaries in the 1920s left Kawaihau with Olohena as its southernmost boundary and Moloa`a as its northernmost boundary (King 1935:222).

Traditional and Legendary Accounts of Kapa`a

A more in depth study of the legends and mythology of Kapa`a can be found in the Cultural Impact Assessment for the Proposed Kapa`a Highlands Phase II [EAL 2012]. Just a few of some of the legends of the area are included in this report.

Pahla and Ka`ea

High in the mauka region of Kapa`a in the Makaleha mountains at a place called Ka`ea, is reported to be the supernatural banana grove of the Kaua`i kupua or demigod Palila, grandson of Hina (Handy and Handy 1972:424). In a 1913 edition of the newspaper Ka`oko`a Joseph Akina describes Pahla's banana grove:

The stalk could hardly be surrounded by two men, and was about 35 feet high from the soil to the lowest petiole. The length of the cluster from stem to lowest end of the bunch of bananas was about 1 3/4 fathoms long (one anana and one muku). There were only two bananas on each about 4 inches around the middle. There were just two bananas, one on the east side and one on the west, each about a foot or more in length. The one on the east side was tartish, like a waiaw i (Spanish guava) in taste and the one on the west was practically tasteless. The diameter of the end of the fruit stem of this banana seemed to be about 10 feet. This kind of banana plant and its fruit seemed almost supernatural... (Akina, 1913: 6).

Ka Lulu o Mo`ikeha

Kapa`a was the home of the legendary Mo`ikeha. Born at Waipi`o on the island of Hawai`i, Mo`ikeha sailed to Kahiki (Tahiti), the home of his grandfather Maweke, after a disastrous flood. On his return to Hawai`i, he settled at Kapa`a, Kaua`i. Maweke was delighted and when the boy is questioned as to his purpose, Kila tells his grandfather he is seeking fish for his family. Maweke tells Kila to lead the fish back to his homeland. This is how Maweke led the akule, kawakawa and `opelu to Hawai`i.

He enjoys himself on Kaua`i,
All of Kaua`i is Mo`ikeha's. (Akina, 1913: 6)

Maweke was delighted and when the boy is questioned as to his purpose, Kila tells his grandfather he is seeking fish for his family. Maweke tells Kila to lead the fish back to his homeland. This is how Kila led the akule, kawakawa and `opelu to Hawai`i.

Paka`a and the wind gourd of La`amaomao (Keahiahi)

Kapa`a also figures prominently in the famous story of Pakai`a, and the wind gourd of La`amaomao. Pakai`a was the son of Kuanu`uanu, a high-ranking retainer of the Big Island ruling chief Keawenuie`umi (the son and heir to the legendary...
Chief, Umi), and La’amaomao, the most beautiful girl of Kapa’a and member of a family of high status kahuna. Kuau‘uuanu left the island of Hawai‘i, traveled throughout the other islands and finally settled on Kaua‘i, at Kapa‘a. It was there that he met and married La’amaomao, although he never revealed his background or high rank to her until the day a messenger arrived, calling Kuau‘uuanu back to the court of Keawenuia‘umia.

Intent on seeking out his real father and making himself known to him, Paka‘a prepared for the journey to the Big Island. His mother presented to him a tightly covered gourd containing the bones of her grandmother, also named La‘amaomao, the goddess of the winds. With the gourd and chants taught to him by his mother, Paka‘a could command the forces of all the winds in Hawai‘i. While this story continues on at length about Paka‘a and his exploits on the Big Island and later on Moloka‘i, it will not be dwelt upon further here. It is important to note that several versions of this story do include the chants which give the traditional names of all of the winds at all the districts on all the islands, preserving them for this and future generations (Nakuina 1990; Rice 1923:69-89; Beckwith 1970:86-87; Thrum 1923:53-67; Fomander 1918-19 vol. 5 pt.1:78-128).

Frederick Wichman (1998:84) writes that Paka‘a grew up on a headland named Keahiahi. Here, Paka‘a learned to catch malolo, his favorite fish. After studying the ocean and devising his plan to fabricate a sail, Paka‘a wove a sail in the shape of a crab claw and tried it out on his uncle’s canoe. One day, after going out to catch malolo, he challenged the other fishermen to race to shore. He convinced them to fill his canoe with fish suggesting it was the only way he could truly claim the prize if he won:

The fishermen began paddling toward shore. They watched as Paka‘a paddled farther out to sea and began to fumble with a pole that had a mat tied to it. It looked so funny that they began to laugh, and soon they lost the rhythm of their own paddling. Suddenly Paka‘a’s mast was up and the sail filled with wind. Paka‘a turned toward shore and shot past the astonished fishermen, landing on the beach far ahead of them. That night, Paka‘a, his mother, and his uncle had all the ma‘o‘o they could eat (Wichman 1998:85).

Kauai State Museum

Heiau of Kapa‘a

During their expeditions around Hawai‘i in the 1880’s, collecting stories from ka po‘e kahiko, Lahainaluna students stopped in Kapa‘a and Ko‘olau and gathered information regarding heiau of the region. Altogether, fourteen heiau were named in Kapa‘a and Ko‘olau, suggesting the two ahupua‘a were probably more politically significant in ancient times. Table 1 lists the names of the ten heiau identified in the ahupua‘a of Kapa‘a, their location if known, their type, and associated chief and priest.

Table 1. Heiau of Kapa‘a

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Type</th>
<th>Associated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kapa‘a (Malohuna is the area of the present day Kapa‘a School)</td>
<td>Unknown</td>
<td>Kiha, Kaumuali‘i/Lukahakona</td>
<td></td>
</tr>
<tr>
<td>Pu‘uo</td>
<td>Kapa‘a</td>
<td>Unknown</td>
<td>Kiha, Kaumuali‘i</td>
</tr>
<tr>
<td>Pahu</td>
<td>Kapa‘a/Kealia</td>
<td>Unknown</td>
<td>Kiha/Lukahakona</td>
</tr>
<tr>
<td>Kumu‘ae</td>
<td>Kapa‘a/Kealia</td>
<td>Unknown</td>
<td>Kiha/Lukahakona</td>
</tr>
<tr>
<td>Waikuhumalama</td>
<td>Kapa‘a/Kealia</td>
<td>Unknown</td>
<td>Kiha/Lukahakona</td>
</tr>
<tr>
<td>Napu‘upa‘aka</td>
<td>Kapa‘a/Kealia</td>
<td>Unknown</td>
<td>Kiha/Lukahakona</td>
</tr>
<tr>
<td>Naoamakai‘i</td>
<td>Kapa‘a/Kooliai</td>
<td>Heiau for birth of Kaua‘i Chiefs, like Hohshokiulu</td>
<td></td>
</tr>
<tr>
<td>Pu‘ukoa</td>
<td>Kapa‘a/Kealia</td>
<td>Ulu type heiau</td>
<td>Unknown</td>
</tr>
<tr>
<td>Piouka</td>
<td>Kapa‘a/Kealia</td>
<td>Ulu type heiau</td>
<td>Unknown</td>
</tr>
<tr>
<td>Una</td>
<td>Kapa‘a/Kealia</td>
<td>Unknown</td>
<td>Kiha/Lukahakona</td>
</tr>
<tr>
<td>Manu</td>
<td>Kapa‘a/Kealia</td>
<td>Unknown</td>
<td>Kiha/Lukahakona</td>
</tr>
<tr>
<td>Kuahaii</td>
<td>Kapa‘a (gov’t school stands on site now)</td>
<td>Unknown</td>
<td>Kaumuali‘i/Lukahakona</td>
</tr>
<tr>
<td>Makanalimu</td>
<td>Upland of Kawai‘ahu</td>
<td>Unknown</td>
<td>Kaumuali‘i</td>
</tr>
<tr>
<td>Kaluolumokai‘a</td>
<td>Kapa‘a</td>
<td>Unknown</td>
<td>Moikeha</td>
</tr>
</tbody>
</table>

The exact locations of these heiau are unknown. The locations of two of the heiau correlate with the locations of wahi pana which are known to be close to Kuahaii and Kaluolumo’ikeha. Kuahaii (also spelled Kaahaii and Keahaii) is the rocky headland at the north end of Kapa‘a where the first Kapa‘a School was once located. Kaluolumo’ikeha is thought to be the general area near the Moikeha Canal and the present day Coral Reef Hotel.

Kauai State Museum
The Mahāle: Kapaa’ Land Commission Awards

The Organic Acts of 1845 and 1846 initiated the process of the Mahāle, the division of Hawaiian lands, which introduced private property into Hawaiian society. In 1846 the crown and the ali`i received their lands. The common people received their kūkāina in 1850. It is through records for Land Commission Awards (LCAs) generated during the Mahāle that specific documentation of traditional life in Kapaa’ Ahupua`a comes to light. During the Mahāle, Kapaa’ was taken as Crown Lands (Office of the Commissioner of Public Lands of the Territory of Hawaii, 1929). The `Ili of Kapaa’ Ahupua`a `Ili were retained as Government Lands.

Table 2. Mahāle Land Claims in Kapaa’ Ahupua`a

<table>
<thead>
<tr>
<th>LCA Number</th>
<th>Ahupua’a</th>
<th>Claimant</th>
<th>`Ili of the Ahupua’a</th>
<th>Village/Farm</th>
<th>Land Use</th>
<th>Number of ʻÅpana</th>
</tr>
</thead>
<tbody>
<tr>
<td>3971</td>
<td>Kapa’a</td>
<td>Honoli,</td>
<td>Kapanan</td>
<td>Kupanai Village</td>
<td>6 ʻlo`i (uncult), house lot</td>
<td>2 (2 acres, 1 rood, 1 rod)</td>
</tr>
<tr>
<td>3554</td>
<td>Kapa’a</td>
<td>Keo</td>
<td>Kahanui</td>
<td>Pui Village</td>
<td>15 ʻlo`i, house lot</td>
<td>2 (7 acres, 1 rood, 17 rods)</td>
</tr>
<tr>
<td>3638</td>
<td>Kapa’a</td>
<td>Hululii</td>
<td>Maaiele</td>
<td>Kaloko Village</td>
<td>12-15 ʻlo`i, house lot</td>
<td>2 (5 acres, 1 rood, 19 rods)</td>
</tr>
<tr>
<td>8247</td>
<td>Kapa’a</td>
<td>Ehu</td>
<td>Moaiepe/Moaiepe</td>
<td></td>
<td>20 ʻlo`i</td>
<td>1 (3 rods)</td>
</tr>
<tr>
<td>8837</td>
<td>Kapa’a</td>
<td>Kamaapa</td>
<td>Ulukiu lab-Awakalua Ulukiu</td>
<td></td>
<td>3 ʻlo<code>i, 2 ʻlo</code>i, house lot</td>
<td>1 (2 acres, 2 rods, 27 rods)</td>
</tr>
<tr>
<td>8843</td>
<td>Kapa’a</td>
<td>Kiau</td>
<td>Apopo</td>
<td>Kaloko Village</td>
<td>6 (5 ʻlo`i and Aub), house lot</td>
<td>2 (2.75 acres 3 rods)</td>
</tr>
<tr>
<td>10564</td>
<td>Kapa’a</td>
<td>Oleko Daniel</td>
<td>Hikini Farm</td>
<td></td>
<td>Flatpond, 10 ʻlo`i</td>
<td></td>
</tr>
</tbody>
</table>

The land claims during this period show that only five individuals were awarded land parcels in the relatively large ahupua`a of Kapaa’. The five awardees were Kaua (#08843), Kamapa (08837), Mane Honoli (#03971) Hulii (#03638) and Ehu (#08247). All four had ʻlo`i or irrigated kalo fields on the mauka side of the lowland swampy area, sometimes extending a short distance up into small, shallow gulches and valleys. Many of these ʻlo`i/parcels name pa`a or hills/cliffs as boundaries. Each LCA also had a separate house lot located on the makai side of the swamp, near the beach. Three of the land claims name ponds on their lands, including Pulu Pond (LCA #03554), and fishponds in Kupanui `Ili (LCA #03971) and Hahanui `Ili (LCA #01654). Loko Kihapai may be the same as the fishpond in the same land claim. The other two ʻlo`i are associated with house lots, situated on the makai edge of the Kapaa’ swamplands suggesting modification of the natural swamplands.

Early Historic Accounts of Kapaa (1830s-1900s)

Although most of the historic record documents for Kauai in this period revolve around missionary activities and the missions themselves, there was indication that the Kapaa area was being considered for new sugar cane experiments, similar to those occurring in Koloa. In 1835 Ladd and Company received a 50 year lease on land in Koloa from Kamehameha III and Kauai Governor Kaikio`ewa of Kauai. The terms of the lease allowed the new sugar company "the right of someone other than a chief to control land" and had profound effects on "traditional notions of land tenure dominated by the chiefly hierarchy" (Donohugh, 2001: 88). In 1837, a very similar lease with similar terms was granted to Wilama Ferani, a merchant and U.S. citizen based in Honolulu (Hawai`i State Archives, Interior Dept., Letters, Aug. 1837). The lease was granted by Kauia`kouli for the lands of Kapaa, Kaeila and Waipouli for twenty years for the following purpose:

...for the cultivation of sugar cane and anything else that may grow on said land, with all of the right for some place to graze animals, and the forest land above to the top of the mountains and the people who are living on said lands, it is to them whether they stay or not, and if they stay, it shall be as follows: They may cultivate the land according to the instructions of Wilama Ferani and his heirs and those he may designate under him... (Hawai`i State Archives, Interior Dept., Letters, Aug. 1837).

Unlike Ladd & Company which eventually became the Koloa Sugar Company, there is no further reference to Wilama Ferani and his lease for lands in Kapaa, Kaeila and Waipouli. In a brief search for information on Honolulu merchant, Wilama Ferani, nothing was found. It is thought that perhaps Wilama Ferani may be another name for William French, a well-known Honolulu merchant who is documented as having experimented with grinding sugar cane in Wai`ahe, Kauai at about the same time the 1837 lease for lands in Kapaa, Kaeila and Waipouli was signed (Joesting 1984: 152).

In 1849, son of Wai`oli missionary, William P. Alexander, recorded a trip he took around Kauai. Although, he focuses on the larger mission settlements like Koloa and Hanalei, he does mention Kapaa’:

A few miles from Waialua, near Kapaa we passed the wreck of a schooner on the beach, which once belonged to Capt. Bernard. It was driven in a gale over the reef, and up on the beach, where it now lies. A few miles further we arrived at Kaeila. We had some difficulty crossing the river at this place, owing to the restiveness of our horses. The country here near the shore was rather uninteresting, except the valley which always contained streams of water (Alexander 1991: 123).
In later years, the notorious Kapaa reef was to become the location of many shipwrecks once a landing was built there in the 1880s.

The first large-scale agricultural enterprise was begun in Kapaa in 1877 by the Makee Sugar Plantation and the Hui Kawaihau (Dole 1916: 8). Originally a choral society begun in Honolulu its membership consisted of many prominent names, both Hawaiian and haole. It was Kalakaua’s thought that the Hui members could join forces with Makee, who had previously sugar plantation experience on Maui, to establish a successful sugar corporation on the east side of Kaua‘i. Captain Makee was given land in Kapaa to build a mill and he agreed to grind cane grown by Hui members. Kalakaua declared the land between Waika and Moloka‘i, the Kawaihau District, a fifth district and for four years the Hui attempted to grow sugar cane at Kapaa, on the plateau lands above Kapaa town. After a fire destroyed almost half of the Hui’s second crop and after the untimely death of one of their principal advocates, Captain James Makee, the Hui began to disperse and property and leasehold rights passed on to Makee’s son-in-law and new Makee Plantation owner, Colonel Z.S. Spalding (Dole 1916: 14).

As part of the infrastructure of the new plantation, a sugar mill was erected and the Makee Landing was built in Kapaa during the early years of operation of the Makee Sugar Plantation. Following Captain Makee’s death, Colonel Spalding took control of the plantation and in 1885 moved the mill to Kealia (Cook 1999: 51). The deteriorating stone smokestack and landing were still there well into the 1900s (Damon 1931:359). Conde’s and Best (1973:180) suggest that railroad construction for the Makee Plantation began just prior to the mid-1890s. There is one reference to a railroad line leading from the Kapaa landing to Kealia in 1891. During Queen Lili‘uokalani’s visit to Kaua‘i in the summer of 1891, the royal party was treated to music by a band, probably shipped in from O‘ahu. “The band came by ship to Kapaa and then by train to Kealia” (Joesting 1984:252). This railroad line is depicted on a 1910 USGS map which shows the line heading south from Kealia Mill and splitting near the present Coral Reef Hotel; another line going to the old Kapaa Landing (Makee Landing) and another line heading mauka, crossing the present Moikeha Canal, traveling southwest up Lehua Street and through what is now golf pastures, along a plateau and into the mauka area behind Kapaa swamplands. This railroad line was part of a twenty mile network of plantation railroad with some portable track and included a portion of Kealia Valley and in the mauka regions of the plateau lands north of Kealia (Conde’s and Best 1973:180).

By the late 1880s hundreds of Portuguese and Japanese immigrants found work on Makee Plantation and the new influx of immigrants required more infrastructure (Cook 1999:51). In 1883, a lease for a school lot was signed between Makee Sugar Company and the Board of Education (Kapaa School 1983: 9). Stipulations in the Portuguese immigrant contracts with Makee Sugar Company stated that “children shall be properly instructed in the public schools” (Garden Island April 1, 1983). The original Kapaa School was constructed in 1883 on a rocky point adjacent to the Makee Sugar Company railroad. Traditionally, this point was known as Kaahiahi (Kapaa School 1983: 10). In 1908, Kapaa School was moved to its present site directly mauka and up the hill at Malehune.

Narrow wagon roads gave way to macadamized roads in the early part of the 20th century. One of these new roads was called the Kaua‘i Belt Road and parts of it are thought to have followed along the “Old Government Road” (Cook, 1999). In Kapaa, the present day Kuhio Highway likely follows the same route as the original Government Road and subsequent Kaua‘i Belt Road. In fact, the locations of the kuleana awards in Kapaa indicate that the majority of the house lots were situated along the Government Road. LCA 3243 names a “road” as one of its boundaries.

In the latter half of the 1800s, following Makee’s death, Chinese rice farmers began cultivating the lowlands of Kapaa with increasing success. Several Hawaiian kuleana owners leased or sold their parcels mauka of the swamp land to Chinese rice cultivators. Other Chinese rice cultivators appealed to the government for swampland, first leasing and later buying the land. The economic activity displaced the house lot kuleana on the makai side of the marsh for increasing commercial and residential development (Lai 1985:148-161).
Severe floods in Kapaa in 1940 led to the dredging and construction of the Waikaea and Mokeha Canals sometime during that decade. (Hawaii Territorial Planning Board, 1940: 7). Although the Waikaea Canal, bordering the Kapaa Pineapple Cannery, had been proposed as early as 1923, nothing was constructed until after the floods (Bureau of Land Conveyances, Grant 8248). A Master Plan for Kapaa, published in 1940, asks the Territorial Legislature for funds to be set aside for the completion of a drainage canal and for filling makai and mauka of the canal (Hawaii Territorial Planning Board, 1940:7). In 1955, the local newspaper reported the dredging of coral from the reef fronting Kapaa Beach Park for the building of plantation roads (Garden Island Newspaper, September 21, 1955). This dredging was later blamed for accelerated erosion along Kapaa Beach (Garden Island Newspaper, October 30, 1963). Today, there are several seawalls along the Kapaa Beach Park to check erosion. Old time residents claim the sandy beach in Kapaa was once much more extensive than it is now (Bushnell et al. 2002).

In the 1930s after the incorporation of Makee Sugar Company into Lihue Plantation, Kealia Town was slowly abandoned. Many of the plantation workers bought property of their own and moved out of the plantation camps. The camps which bordered Kuhio Highway were disbanded in the 1980s. In the last part of the 20th century the Lihue Plantation began to phase out and Kapaa Town suffered after the closing of the Kapaa Cannery; however the growing tourist industry helped to ease the economic effects of the Cannery’s closing.

### Previous Archaeological Research

#### Archaeological Studies and Sites in Kapaa’ahupua’a

The following table outlines the archaeological research (Table 3) and historic properties (Table 4) identified in Kapaa’ahupua’a. These tables are followed by discussion of the research and historic properties. Table 3 provides a list of archaeological research conducted within Kapaa’ahupua’a, including columns for source, location, nature of study, and findings. The locations of these archaeological studies are shown in Figure 4. Table 4 is a list of known historic properties within the ahupua’a and includes columns for state site numbers, site type, location and reference. The locations of identified sites within Kapaa’ahupua’a are shown in Figure 5. All site numbers are numbered 50-30-08-SHIP site number. Here only the SHIP sit number designation will be used.

<table>
<thead>
<tr>
<th>Source</th>
<th>Location</th>
<th>Nature of Study</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bennett 1931</td>
<td>Island wide: identifies 2 sites: Site 110 Taro terraces and bowl and Site 111 A large simple dirt Hawaiian ditch</td>
<td>Archaeological Reconnaissance</td>
<td>Identifies 2 sites: Site 110 Taro terraces and bowl and Site 111 A large simple dirt Hawaiian ditch</td>
</tr>
<tr>
<td>Handy and Handy 1972</td>
<td>Archipelago-wide</td>
<td>Native Planter study</td>
<td>Discusses “highly developed irrigation system”</td>
</tr>
<tr>
<td>Ching 1976</td>
<td>Just south of the Waikaea Drainage Canal</td>
<td>Archaeological Reconnaissance</td>
<td>No significant findings</td>
</tr>
<tr>
<td>Hammatt 1981</td>
<td>Upland Kapaa</td>
<td>Archaeological Reconnaissance</td>
<td>No significant findings</td>
</tr>
<tr>
<td>Hammatt 1986</td>
<td>Upper reaches of the Makaloha stream valley</td>
<td>Archaeological Reconnaissance</td>
<td>No significant findings</td>
</tr>
<tr>
<td>Hammatt 1991</td>
<td>Along Kuhio Highway</td>
<td>Subsurface Testing</td>
<td>Identifies two sub-surface cultural layer sites</td>
</tr>
<tr>
<td>Kikuchi and Remaldo 1992</td>
<td>Around Kapaa Town</td>
<td>Cemeteries of Kauai</td>
<td>Identifies six cemeteries</td>
</tr>
<tr>
<td>Spear 1992</td>
<td>South side Waikaea Canal, mauka of Kuhio Highway. (TMK: 4-5-05.04, 09)</td>
<td>Monitoring Report</td>
<td>Designated subsurface Site 547</td>
</tr>
</tbody>
</table>

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**PREVIOUS ARCHAEOLOGICAL RESEARCH**
<table>
<thead>
<tr>
<th>Source</th>
<th>Location</th>
<th>Nature of Study</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chaffee, Burgett &amp; Spear 1994a</td>
<td>A house lot near the corner of Kukui and Ulu Streets in mauka Kapaa Town. [TMK: 4-5-29-10]</td>
<td>Archaeological Inventory Survey</td>
<td>No significant findings</td>
</tr>
<tr>
<td>Chaffee, Burgett &amp; Spear 1994b</td>
<td>Mamane Street Kapaa Town. [TMK: 4-5-09:51]</td>
<td>Archaeological Inventory Survey</td>
<td>No significant findings</td>
</tr>
<tr>
<td>Hammatt, Ida &amp; Chiogioji 1994</td>
<td>Proposed bypass routes mauka of Kapaa Town</td>
<td>Archaeological Assessment</td>
<td>No new field work, literature review only</td>
</tr>
<tr>
<td>Hammatt, Ida &amp; Folk 1994</td>
<td>South side Waikaea Canal, mauka of Kuhio Highway   [TMK: 4-5-05:00]</td>
<td>Archaeological Inventory Survey</td>
<td>Weak cultural layer designated Site 748</td>
</tr>
<tr>
<td>Kawachi 1994</td>
<td>Inia Street (Jasper) [TMK 4-5-05:33]</td>
<td>Burial Report</td>
<td>Designated Site 871</td>
</tr>
<tr>
<td>McMahon 1994</td>
<td>&quot;behind the armory in Kapaa near the god stones&quot; The location is uncertain, and at &quot;Buzz's near the Coconut Marketplace&quot;</td>
<td>Documents a report of two burials</td>
<td>16 sets of human remains. Site numbers unknown</td>
</tr>
<tr>
<td>Creed, Hammatt, Ida, Masterson &amp; Winieski 1995</td>
<td>Kapa'a Sewer line project, Kuhio Highway, south and central Kapaa Town</td>
<td>Archaeological Monitoring Report</td>
<td>Documents cultural layer of Site - 1848 and (an enlarged) Site - 1849 &amp; recovery of thirty burials at Sites —867, -868, -871, and - 1894</td>
</tr>
<tr>
<td>Jourdane 1995</td>
<td>1382-A Inia Street, mauka of Kuhio Highway, central Kapaa Town</td>
<td>Burial Report</td>
<td>Site 626</td>
</tr>
<tr>
<td>McMahon 1996</td>
<td>South side Waikaea Canal, mauka of Kuhio Highway [TMK: 4-5-05:08]</td>
<td>Archaeological Inventory Survey</td>
<td>No significant cultural material</td>
</tr>
<tr>
<td>Hammatt, Chiogioji, Ida &amp; Creed 1997</td>
<td>Test excavations focused inland of Kapaa Town</td>
<td>Archaeological Inventory Survey</td>
<td>Four test trenches were excavated inland of Kapaa Town</td>
</tr>
<tr>
<td>Borthwick and Hammatt 1999</td>
<td>Kapaa Seventh-Day Adventist Church at 1132 Kuhio Highway</td>
<td>Archaeological Monitoring and Burial Treatment Plan</td>
<td>Monitoring was indicated as this parcel lay within designated Site 1848.</td>
</tr>
</tbody>
</table>

Figure 6. Map showing previous archaeological studies in Kapaa.
<table>
<thead>
<tr>
<th>Site #</th>
<th>Ahupua'a</th>
<th>Site Type/ Name (if any)</th>
<th>Location</th>
<th>Site Constraints</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>8001</td>
<td>Kapa'a</td>
<td>Historic Cemetery</td>
<td>South of bend of Kapa'a Stream, a kilometer mauka from Kuhio Hwy</td>
<td>Appears to be a discrete historic cemetery</td>
<td>Kikuchi and Remoaldo 1992</td>
</tr>
<tr>
<td>8002</td>
<td>Kapa'a</td>
<td>Historic Cemetery</td>
<td>Just mauka from Kuhio Highway, south of Kapa'a Stream</td>
<td>Appears to be a discrete historic cemetery</td>
<td>Kikuchi and Remoaldo 1992</td>
</tr>
<tr>
<td>8003</td>
<td>Kapa'a</td>
<td>Kapa'a Public Cemetery</td>
<td>South of Kanaele Road, one kilometer inland of Kuhio Highway</td>
<td>Appears to be a discrete historic cemetery</td>
<td>Kikuchi and Remoaldo 1992</td>
</tr>
<tr>
<td>8004</td>
<td>Kapa'a</td>
<td>Historic Cemetery</td>
<td>North of Apopo Road, one kilometer inland of Kuhio Highway</td>
<td>Appears to be a discrete historic cemetery</td>
<td>Kikuchi and Remoaldo 1992</td>
</tr>
<tr>
<td>8013</td>
<td>Kapa'a</td>
<td>Historic Cemetery</td>
<td>Just mauka from Kuhio Highway, north of the Waikae'a Canal</td>
<td>Appears to be a discrete historic cemetery</td>
<td>Kikuchi and Remoaldo 1992</td>
</tr>
<tr>
<td>8014</td>
<td>Kapa'a</td>
<td>All Saints Episcopal Church Cemetery</td>
<td>Just mauka from Kuhio Highway, south of the Waikae'a Canal</td>
<td>Appears to be a discrete historic cemetery</td>
<td>Kikuchi and Remoaldo 1992:62-65</td>
</tr>
<tr>
<td>547</td>
<td>Kapa'a</td>
<td>Sub-surface features including a frepit and a possible house foundation</td>
<td>South of bend of Waikae'a Canal, mauka of Kuhio Highway</td>
<td>Archaeological monitoring in the vicinity recommended</td>
<td>Spear 1992:3</td>
</tr>
<tr>
<td>626</td>
<td>Kapa'a</td>
<td>Burial</td>
<td>Inia Street, mauka of Kuhio Highway</td>
<td>Consultation and monitoring in vicinity indicated</td>
<td>Joulande 1995</td>
</tr>
<tr>
<td>748</td>
<td>Kapa'a</td>
<td>Minimal findings, a weak cultural layer (buried A-horizon)</td>
<td>South of the bend of the Waikae'a Canal, mauka of Kuhio Highway</td>
<td>Considered no longer significant within project area</td>
<td>Hammatt et al. 1994</td>
</tr>
<tr>
<td>788</td>
<td>Kapa'a</td>
<td>Burial</td>
<td>Coastal Cane Haul Road near Kawashau Road turn off</td>
<td>Unknown</td>
<td>Perczinski et al. 2000</td>
</tr>
<tr>
<td>867</td>
<td>Kapa'a</td>
<td>1 set of human remains</td>
<td>Kuiki Street, just mauka of Kuhio Highway, Kapa'a Town</td>
<td>Consultation and monitoring in vicinity indicated</td>
<td>Creed et al. 1995:50</td>
</tr>
<tr>
<td>868</td>
<td>Kapa'a</td>
<td>1 set of human remains</td>
<td>Lehua Street mauka of Kuhio Highway, Kapa'a Town</td>
<td>Consultation and monitoring in vicinity indicated</td>
<td>Creed et al. 1995:50</td>
</tr>
<tr>
<td>871</td>
<td>Kapa'a</td>
<td>13 sets of human remains (Creed et al. 1995:50)</td>
<td>Inia Street, mauka of Kuhio Highway</td>
<td>Consultation and monitoring in vicinity indicated</td>
<td>Kawachi 1994; Creed et al. 1995:50</td>
</tr>
<tr>
<td>1848</td>
<td>Kapa'a</td>
<td>Cultural layer and sub-surface features</td>
<td>Along Kuhio Highway between Wana Road and the Waikae'a Drainage Canal</td>
<td>Archaeological monitoring in the vicinity recommended</td>
<td>Hammatt 1981; Creed et al. 1995</td>
</tr>
<tr>
<td>1849</td>
<td>Kapa'a</td>
<td>Cultural layer and sub-surface features; Creed et al. 1995:53 expands boundaries to incl. burial sites 626, -667, -866, -971, and -1894</td>
<td>Along Kuhio Highway between Inia Street and Kauwila Street extending to the coast</td>
<td>Consultation and monitoring in vicinity indicated</td>
<td>Hammatt 1991; Creed et al. 1995</td>
</tr>
<tr>
<td>1894</td>
<td>Kapa'a</td>
<td>11 sets of human remains</td>
<td>Uh Street, just north of Kuhio Highway, Kapaa Town</td>
<td>Consultation and monitoring in vicinity indicated</td>
<td>Creed et al. 1995:50</td>
</tr>
<tr>
<td>2075</td>
<td>Kapa'a/Kealia</td>
<td>Highway Bridge Foundation (old Kaua'i Belt Road)</td>
<td>Kuhio Highway at Kapaa Al Kealia River</td>
<td>Unknown</td>
<td>Bushnell et al. 2002:55</td>
</tr>
<tr>
<td>2076</td>
<td>Kapa’a</td>
<td>Petroglyph</td>
<td>Rocky coast below former cane haul road (Site -789)</td>
<td>Preservation</td>
<td>Bushnell et al. 2002:55</td>
</tr>
<tr>
<td>2077</td>
<td>Kapa’ a</td>
<td>Concrete steps (related to historic beach pavilion)</td>
<td>Near present Kapaa Beach Park Pavilion</td>
<td>Unknown</td>
<td>Bushnell et al. 2002:55</td>
</tr>
</tbody>
</table>
Pattern of Archaeological Sites in Kapa’a

The pattern of archaeological studies in Kapa’a Ahupua’a is somewhat skewed with a dozen projects in urban Kapaa Town and very little work along the coast (Figure 4). Major archaeological sites have been found in area include extensive cultural layers with burials and other cultural features underlying Kuhio Highway near All Saints Gym, and near the older part of Kapaa Town between Waiakoa Canal and Kapaa Beach Park, makai of Kuhio Highway (Hammatt 1991; Kawachi 1994; Creed et al. 1995; Jourdane 1995; Callis 2000). The mauka-makai extent of these...
cultural layers has not been clearly defined. The five kuleana awarded during the Mahele are located adjacent to the present coastal highway. The areas directly mauka of Kapaa Town are marshy though much of it has been filled in recent decades for the ByPass Road and shopping centers and housing. These cultural deposits associated with pre-historic and early historic habitation are known to exist in a relatively narrow sand berm that makes up the physiogeography of Kapa’a. The more mauka studies but still lower coastal areas, suggest they are located towards the mauka fringe of the sand berm, approaching more marshy conditions and have generally reported no significant or minimal findings (Spear 1992; Chaffee et al. 1994a & 1994b; Hammatt et al. 1994, 1997; McMahon 1996). Less than 1.5 km to the south of Waikaea Canal at the southern boundary of Waipouli adjacent to Uhalikeawa Stream (Waipouli Stream) and the ocean is another extensive subsurface cultural deposit which is associated with a pre-contact fishing encampment located (Hammatt et al. 2000).

Anticipated sites based on historic and archaeological studies in mauka Kapa’a are the remains of cane cultivation infrastructure such as ditches and pre-contact too historic period Native Hawaiian terracing for lo‘i cultivation with nearby habitation sites in the gulches, however the gulches lay outside the current project area.

RESULTS OF FIELD WORK

Pedestrian Survey

On January 3 and April 25, 2012 Exploration Associates Ltd. archaeologist Nancy McMahon, M.A. made field inspections on proposed Kapa’a Highlands project area. Access was made via Oloheana Road (two gates). North-south oriented transects were utilized to 100% survey the project area. Because of known historic cane cultivation in this area of Kapa’a, predicted sites might be historic plantation related infrastructure such as ditches, flumes, roads, temporary cane-haul railroad berms and reservoirs. None were observed during the survey. The shallow ravine the project area were surveyed and tested, however no pre-Contact or historic era terraces or habitation sites were revealed. The parcel contains no surface archaeological sites. The access road is related to access for construction of the buildings already present on the Phase I parcel.

Subsurface Testing

On November 11, 2012, three trenches were excavated with a backhoe with a 24 in. width bucket (Figure 8). Trench 1 was excavated to a depth of 183 cm with a length of 10 meters. Trench 2 was excavated to a depth of 160 cm and a length of 3 m. Trench 3 was excavated to a depth of 260 cm and a length of 2.5 m. Each evinced the same soil composition. A description of the soils representing all three trenches is presented here.

A representative profile description evinced the same stratigraphy consisting in all three trenches, consisting of three soil layers with only a single clear boundary delineating the topsoil from the underlying soils. Soil differences could only be determined utilizing the Munsell Color Chart. The topsoil in each trench 5 YR 4/3 reddish brown organic. The other two layers are classified as 5 YR 5/6 yellowish red [20 cmbs] and 5 YR 4/6 yellowish red [20cmbs to base of excavation]. Characteristics are dry to very dry, crumbly, medium firm, clayey silt. It is pretty much cultivated soils. A local informant, Mr. Vasquez, who worked for the Lihue plantation most of his life. Informant stated the plantation chain and ball dragged this land several time over.

A geologic survey was undertaken on the adjacent Phase I parcel prior to the construction of a solar farm. Soils extracted and examined in test trenches revealed only agricultural soils. No buried cultural layers or plantation infrastructure was present.
Figure 9. Profile Test Trench 2 on the left and Trench 3 right.

Figure 10. Entrance off Olohena Road looking makai in the distance the Solar Farm part of Phase I

Figure 11. Access Road to Solar Farm with Cattle Grazing in the Distance.
Figure 12. Lower Elevation Outside Project Area from the access road.

Figure 13. View Across the Project Area, Facing Makai and Northeast.
RECOMMENDATIONS

As no archaeological sites are present, there are no historic preservation concerns for this project. We recommend no further historic preservation work. Though highly unlikely, if any human remains or other significant subsurface deposits are encountered during the course of development activities all work in the immediate area should stop and the State Historic Preservation Division promptly notified.
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APPENDIX A

Photos of the Area Surveyed
Figure 1. View of Project Area from the gate at the top of Olohena Road.

Figure 2. Solar Farm on Phase I Property view to north.

Figure 3. Cattle Grazing in the Project Area.
Figure 4. Fence in the left side of photo indicating property boundary.

Figure 5. Goats Grazing in the Project Area.
APPENDIX B

State Historic Preservation Letter (June 2010) Requesting Survey
State Historic Preservation Letter (December 1999) Subdivision “No Effect”
APPENDIX C

Report of Geotechnical Evaluation Kapaa Solar Field
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Purpose</td>
<td>1</td>
</tr>
<tr>
<td>Scope</td>
<td>1</td>
</tr>
<tr>
<td>Location</td>
<td>1</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>2</td>
</tr>
<tr>
<td>PROPOSED DEVELOPMENT</td>
<td>3</td>
</tr>
<tr>
<td>GEOLOGIC CONDITIONS</td>
<td>3</td>
</tr>
<tr>
<td>TSUNAMIS</td>
<td>4</td>
</tr>
<tr>
<td>SURFACE AND SUBSURFACE WATER</td>
<td>4</td>
</tr>
<tr>
<td>SOIL MATERIAL PROPERTIES</td>
<td>4</td>
</tr>
<tr>
<td>EARTHQUAKES</td>
<td>5</td>
</tr>
<tr>
<td>CONCLUSIONS</td>
<td>5</td>
</tr>
<tr>
<td>Feasibility</td>
<td>5</td>
</tr>
<tr>
<td>Site Preparation</td>
<td>5</td>
</tr>
<tr>
<td>Foundation Design</td>
<td>5</td>
</tr>
<tr>
<td>Pavement Design</td>
<td>5</td>
</tr>
<tr>
<td>PLATE 1 - LOCATION MAP</td>
<td>6</td>
</tr>
<tr>
<td>PLATE 2 - GEOTECHNICAL MAP</td>
<td>7</td>
</tr>
<tr>
<td>APPENDIX</td>
<td>A-1</td>
</tr>
</tbody>
</table>

## INTRODUCTION

This report summarizes the results of our evaluation of the geotechnical feasibility of construction of a solar farm west of the town of Kapaa, Kauai. We undertook the evaluation to provide a basis for assessing the geotechnical conditions within the project site.

### PURPOSE

This report is for the exclusive use of our client, Wagner Engineering Services, Inc. Its purpose is to satisfy the terms of the contract between the project owner and the consultant. The report summarizes the findings, conclusions and recommendations which were generated by the evaluation. The intent of the report has been to present conclusions and recommendations in a logical manner, so as to assist the owner and their design team in preparing plans and specifications for the project.

### SCOPE

As outlined in our contract dated August 22, 2010, the following work elements were performed:

- Review of available geologic data and stereographic aerial photograph.
- Subsurface exploration using a ribbon-fed “Extradrig” probe.
- Laboratory testing of selected samples of soil collected during subsurface exploration.
- Preparation of a geotechnical report summarizing our findings, conclusions, and recommendations.

### LOCATION

The site is located slightly less than three miles west of the town of Kapaa. It is accessed by an unpaved road exiting from Oiopuna Road. The site is shown on Plate 1 - Location Map.

### REFERENCES

The following references were used in preparing our proposal, conducting our evaluation and preparing this report.
Our subsurface exploration indicates that the site is an erosion terrace formed by previous stream action. Subsequent erosion has produced a residual soil profile which grades from a fully developed, moderately firm, surface soil to very stiff weathered rock at a depth of about six feet. In this area, as is the case on the majority of the eastern side of the island, the underlying rock is part of the Koolau series of volcanic flow material.

**TSUNAMIS**

The Island of Kauai is susceptible to damage from tsunamis. Although there is a comparatively sophisticated early warning system in place worldwide, the ability of the system to predict the size of any particular event is limited. The general consensus is that tsunamis are certain to occur but their frequency is uncertain. Published data suggest that the site is not vulnerable to damage from tsunami run-up of the magnitude experienced in the Hawaiian Islands historically.

**SURFACE AND SUBSURFACE WATER**

Drainage on the property occurs as southwesterly sheet flow from the slopes below Olomana Road toward the established stream. At the time of our exploration, drought conditions existed on the island and surface was non-existent.

We found no subsurface water to the depth of exploration. Because of the existing drought conditions, the near-surface soil was dry and brittle.

**CONCLUSIONS**

Based on the results of our geotechnical evaluation, we can offer the following conclusions.

**FEASIBILITY**

In our opinion, it is geotechnically feasible to develop the site essentially as proposed provided the improvements are properly designed and constructed.

**SITE PREPARATION**

We have assumed that little or no grading, other than that required for the formation of an access road and support facilities will be needed. Moreover, it is our understanding that the arrays will be supported by some form of pipe piles. As a result, it is likely that site preparation will be minimal.
EARTHQUAKES

The island of Kauai is in Uniform Building Code seismic zone 1, a designation indicative of a low level of seismic activity. Published data indicate that, during the period 1962 to 1980, for example, there were no recorded earthquakes with a Richter Magnitude greater than 2.0 with an epicenter on or near Kauai. Within the last two years, however, earthquakes in the Richter Magnitude 3 to 4 range have occurred offshore of Maui and Oahu as well as in the Iao stream area of the Big Island and magma production from Kilauea has altered permissively. Of particular importance was the October 15, 2006, M=6.7 and the November 23, 2006, M=5.0 events off the Kona Coast. This may be indicative of shifts in the Pacific tectonic plate which could generate an increase in seismic activity for the near future. As part of our evaluation, we have provided below the numeric parameters necessary to perform the site characterization analysis required by the 1997 Uniform Building Code.

Soil Profile: S,

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<th>Parameter</th>
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<td>Np</td>
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In our opinion, it is likely that the site will experience low-level ground shaking due to seismic activity on or near the Big Island, but the magnitude and number of these events will not be larger than those in the historic record.

TSUNAMI

Tsunami run-up of historic proportions has been in the 10 to 40 foot range and, historically, has been concentrated on the north shore of the island. Although the pro-historic “monster” tsunami is still a theoretical possibility, the design practice in coastal areas of the island has apparently been to consider the run-up of historic proportions. The site of the proposed solar field is well above the elevation of historic run-up.

FOUNDATION DESIGN

The upper two feet of the surficial soil in the area of the array is poorly consolidated and should not relied for either foundation support or uplift resistance. Below two feet, the soil is stiff and capable of generating more than 2500 pounds per square foot for bearing. Uplift resistance can be determined using the relationship (1100d + W) where “d” is outside-diff dimensions, “W” is unit weight of the shaft and “l” is shaft length below two feet. This assumes that the shaft consists of...
APPENDIX
SUPPORTING DATA AND PROCEDURES

SURFACE GEOLOGIC MAPPING

4. Limited amount of surface geologic mapping was performed as part of our evaluation. This mapping was performed both physically and with the aid of topographic maps before and during the subsurface exploration. The results of this work are illustrated with the subsurface exploration.

SUBSURFACE EXPLORATION

Subsurface exploration at the site consisted of the excavation of three trenches using a narthex area backhoe with a three-foot-wide tracker. The trenches were located to (a) aid in establishing a "picture" of probable subsurface conditions at the site, and (b) provide access to the subsurface for possible sampling of soil and rock. To that extent, both the geomorphology of the site and the type and location of proposed improvements have a bearing on the location of subsurface exploration points. Our estimate of the location of each backhoe trench is shown on Plate-2. Geotechnical Map. Geologic logs, using standard United States Geological Survey, United States Corps of Engineers and United States Bureau of Reclamation nomenclature are included in Plate-1 through A-1-3. Log of Test Pit. Upon completion, all pits were backfilled, tamped and wheel-rolled. The location of each test pit was marked with a stake and flagging.

LABORATORY TESTING


data entry

- Initial moisture content and dry density were determined for each "undisturbed" soil sample obtained during exploration. The field moisture content was determined according to ASTM Test Method D2216-66 by obtaining one-half of the moisture sample from each end of the sleeve. The in-place wet and dry density was determined by using the wet weights of the entire sleeve.

- At the same time the field moisture content and in-place dry density were determined, the soil material at each end of the sleeve was classified according to the Unified Soil Classification System and pocket penetrometer readings were taken in the cohesive samples. The results of the field moisture content and in-place dry density tests are presented in Plate A-1 and A-1-2 Log of Test Pit.

Index Tests. For purposes of this report, we have grouped grain-size distribution and Atterberg Limits under "index tests". The bulk sample taken from test pit TP-1 at a depth of two to
### Log of Test Pit No. TP-1

**Date:** 09/3/10  
**Elevation:** +60 (Map Datum)  
**Logged By:** DAE  
**Hole Type:** 6 ft. x 6 ft. Square Holes

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