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PHYLLIS SHIMABUKURO-GEISER
Chairperson, Board of Agriculture

MORRIS M. ATTA
Deputy to the Chairperson

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 South King Street
Honolulu, Hawaii 96814-2512
Phone: (808) 973-9600 FAX: (808) 973-9613

May 14, 2021



Mr. Dean Uchida, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street 7th Floor
Honolulu, Hawaii 96813

Dear Mr. Uchida:

Subject: Special Use Permit (SUP) Application No. 2020/SUP-7
Mahi Solar Project
TMK: 9-2-01: por. 20, 9-2-04: por. 03, 9-2-04: por. 06, 9-2-04: por. 10, and
9-2-04: por. 12
Honouliuli, Ewa, Oahu
Area: 620 acres of 2,952.3 gross acres

The Department of Agriculture (Department) has reviewed the SUP application and offers the following comments and recommendations.

Background

The 620-acre project site consists of five project areas located to the west of Kunia Road . (Application, Figure 2.2, page 2-4; and Appendix B, Figures 2 through 6, unpaginated)

Project Area	Project Area Acreage	Landowner	Historic Agricultural Use
1	21.5	Hartung Bros. Hawaii	irrigated sugar
1, 2A, 2B, 2C, and 3	240.1	Hartung Bros. Hawaii	Irrigated sugar
3	12.1	Hartung Bros. Hawaii	Unirrigated pine
4A, 4B, and 4C	305.6	Fat Law's Farm	Unirrigated pine
5	40.7	Monsanto Technology	Irrigated sugar



Planning and zoning status

All project areas are in the State Agricultural District, within the Agriculture and Preservation Area of the Central Oahu Sustainable Communities Plan and the Ewa Development Plan, and zoned AG-1 (Restricted Agricultural).

Soil index classifications

The soils and historic agricultural uses on the five project areas reflect the availability of irrigation. Irrigated sugarcane was grown makai of the Waiahole Ditch and unirrigated pineapple grown mauka of the Waiahole Ditch. About 400 acres (65 percent) of the project site has "B"-rated soils according to the Land Study Bureau's (LSB) Overall Productivity Rating. "C"-rated soils comprise 115 acres (18 percent), and "D" and "E" soil are 69 acres (11 percent). (Application, Figure 4.2, page 4-5) A cursory review of the project site using the original LSB maps (147, 162, 163, 177) shows that the unirrigated "B", "C", and "D" rated soils would have had their Overall Productivity Ratings improved to "A", "B", and "C", respectively, if irrigation had been available for these soils at the time of the study.

The Agricultural Lands of Importance to the State of Hawaii (ALISH) system classifies the former unirrigated pineapple lands in project areas 4A, 4B, and 4C as mostly "Unique" agricultural lands and "Other Important" agricultural lands in the more sloped areas. "Prime" agricultural lands are found in the project areas makai of the Waiahole Ditch. (Application, Figure 4.3, page 4-8)

The Soil Survey Geographic Database (SSURGO) of the Natural Resource Conservation Service, U. S. Department of Agriculture describes slight to moderately sloped topography for the majority of the project areas with the exception of the southwestern most section of project area 1 and the easternmost section of 2A and 2C. (Application, Figure 4.1, page 4-2) Despite the slope, Appendix B, Figure 2 (unpaginated) indicates installation of solar panel arrays in these three areas.

Designated and proposed Important Agricultural Land status

About 69.5 acres of the 620-acre project site are designated as Important Agricultural Lands (IAL) (Application, Figure 4.4, page 4-10). On page 5-20 of the Application, 85 acres is identified as designated IAL. Assuming the 69.5 acres as the correct acreage, their location and current use are as follows:

29.3 acres in project area 1 (Hartung Bros., unspecified total acreage) and not in agricultural use, and

40.2 acres in project area 5 (Monsanto, total acreage of 40.7) and not in agricultural use.

About 305.6 acres of the 620-acre project site is recommended by the City and County of Honolulu for IAL designation (Application, Figure 4.5, page 4-11). Their location and current use are as follows:

305.6 acres in project area 4 (A, B, and C, Fat Law's Farm) of which about 99 acres is in basil and other vegetables (Application, Figure 3.1, page 3-10), about 200 acres in seed corn, and 51.7 acres located in the gap between 4A and 4B are not in agricultural use. (Application, page 4-9).

Current agricultural use

Of the 620 acres in the project site, 314 acres are currently not in agricultural production. The 306 acres in agricultural production is comprised of seed corn (197 acres), basil and other vegetables (56 acres), and other vegetables (43 acres). (Application, Figure 3.1, page 3-10; Appendix C, Mahi Solar Agricultural Plan, Figure 8, Current Agricultural Activity Map, page 8) The food crops are found in project areas 4B and 4C (Fat Law's Farm) along Kunia Road. (Application, page 3-9)

Irrigation water

The availability of sufficient irrigation water when needed is fundamental to ensuring maximal agricultural productivity for conventional soil-based agricultural production. This is particularly critical during the dry and windy summer months experienced in the area and for crops such as alfalfa. The Kunia Water Association (KWA) provides water service to the project site pursuant to KWA's "lease agreements for the property" (Application, page 6-1) but it is unclear if water will be available to each of the project areas to meet projected needs. The current agricultural activity map (Appendix C, page 23) indicate that irrigation water of unknown quantity is supplied to project areas 2B, 2C, 3, 4A, 4B and 4C for seed corn and basil/other vegetables. Crop irrigation for future agricultural uses will be done by soft hoses (*usually as part of a traveling sprinkler or cable-tow system*) and drip feeder line (*typically drip tape*) (Appendix C, page 39). The Application states that the Agribusiness Development Corporation (ADC) is proposing improvements to the Waiahole Ditch, however "all proposed construction for Mahi Solar project will take place outside of the ADC's proposed improvement areas". (Application, page 6-2)

Department staff notes that Fat Law's Farms has a permit from the Commission on Water Resource Management (CWRM) allowing the withdrawal of up to 0.551 million gallons per day from the Waiahole Ditch to irrigate 329 acres of diversified agriculture, the area of which encompasses all of project areas 4A, 4B, and 4C. Use of the water by parties other than the permittee and the crops that may be irrigated may require

CWRM approval. The cost of water from the KWA ranges from \$1.47 to \$2.04 per thousand gallons. In comparison, Waiahole Ditch water is noted to be \$0.517 (now, \$0.87) per thousand gallons for agricultural usage.

Appendix C (pages 25-26) state that the area to be provided with water infrastructure will increase from the current 262 acres to 442 acres of the of the project site but does not provide further details.

Mean annual rainfall is about 30 inches with January being the wettest month at 4.8 inches. (Application, page 4-1)

The Department strongly recommends that data and information on maximum water demand, sources, storage, pumping, delivery, and year round availability to all five project areas be developed prior to Phase Two of the Agricultural Plan described in Appendix C. Further, this data and information should be provided to agricultural operators interested in the project site or specific project areas for agricultural production including livestock, hydroponic, and aquaponic.

Solar panel coverage by project area

There will be a net area of 147 acres of solar panel coverage on the project site (Application, page 3-7). Department staff was unable to find a breakdown of this area by project area. From Appendix B (Site Plan and Drawings, Prepared by Revamp Engineers and Walters, Kimura, Motoda, Inc. February 2021, Figures 2-5, unpaginated) nearly all of project areas 4A and 4B, and most of 4C (all Fat Law's Farm) will be covered by solar panels. There is a gap between 4A and 4B (described as 51.7 acres in Application, page 4-9) that may be used for "solar panels and/or farming/ranching."

Department staff roughly estimates solar panel coverage as follows:

Nearly all of project area 3 (Hartung Bros.) will be under solar panels.

About 70% of project area 5 (Monsanto) will be under solar panels.

About 50% of project area 1 (Hartung Bros.) in the far western portion of the area will be covered by solar panels and the remainder that may be used for "solar panels and/or farming/ranching."

About 60% of project areas 2A, 2B, and 2C (Hartung Bros.) will be under solar panels and the remainder may be used for "solar panels and/or ranching."

The solar arrays will be six- to eight-feet off the ground when panels are zero degrees tilt (parallel to the ground) At maximum rotation (50 degrees tilt) the arrays will have the lowest edge of the solar panels one- to three-feet off the ground. There will be nine-foot spacing between adjacent arrays of panels at zero degrees tilt. (Application, page

3-4; Appendix B, "Site Plan and Drawings...", Figure 7, unpaginated; and Appendix C, "Agricultural Plan", pages 15-16)

The Agricultural Plan, research, and field testing should include the soft hose irrigation system being proposed for future agricultural activities that may occur under and adjacent to the solar panel arrays.

Fencing

Fencing is important to discourage trespassing and crop or animal theft and to keep livestock from dislocation.

Department staff notes that there will be fencing on the perimeters of the solar paneled areas, however the "solar panels and/or ranching" areas appear to not be fenced. (Appendix B: Site Plan and Drawings, Prepared by Revamp Engineers and Walters, Kimura, Motoda, Inc. February 2021, Figures 2-5)

The extent and type of fencing and gating to be in place prior to full operation of the solar energy facility should reflect the needs of the anticipated agricultural activities and not just providing security for the solar energy facility.

Mahi Solar Agricultural Plan

The proposed agricultural plan would utilize 610 of the 620-acre project. Of the 610 acres, 488.9 acres will be cultivated in crops and used for livestock grazing and bee keeping. (Application, pages 3-10 to -11) Department staff notes that livestock grazing and crop cultivation are not compatible in the same area if they are not effectively separated. The aforementioned proposed fencing can contain livestock under the solar panels to do weed control but that will likely preclude the cultivation of in-ground crops within the same area. Further, as noted on page 3 of this letter, irrigation water in sufficient quantity and availability on demand is fundamental to any crop or livestock operation. There is scant mention of irrigation water and no mention of water for livestock in the Application and Appendix C (Mahi Solar: Agricultural Plan), although water infrastructure is planned for all project areas (Appendix C, Table 1, page 7)

The Agricultural Plan has three phases –

Phase One is two years of research to be done by the Hawaii Agriculture Research Center (HARC) that will include field trials of identified crops at the Clearway solar facility just south of Mililani Town. Conventional and hydroponic cultivation will be used for crops such as lettuce, basil, and alfalfa and other legumes and grasses for livestock forage. The field trials are to determine what crops can be productively grown with what practices under and between solar panels. (Appendix C, pages 19-21)

Phase Two occurs after Mahi Solar is in operation, they “will make available” 610 of the 620-acre project site “to local farmers to grow agricultural products at a commercial scale.” (Application, page 3-12). Department staff find this phase confusing as the Application further states that Mahi Solar will coordinate with local farmers and ranchers, along with HARC and local experts “to propose agrivoltaic projects that they believe will be successful”. (Application, page 3-12) This differs considerably from the description of Phase Two further on in the Application - “As each new agricultural use is tested at the project site in research trials or grown in the solar fields by farmers, HARC and Mahi Solar will gather data and evaluate the results. This will help farmers and ranchers learn and modify their work, in an iterative process.” (Application, page 5-2) Similarly, the linkage between Phase One and Two is made in the Agricultural Plan (Appendix C, page 5), where land and water will be provided to farmers and ranchers to grow out these crops (from Phase One) at commercial scale. This is more in line with the description of Phase Two in the Agricultural Plan (Appendix C, pages 22-26) Mahi Solar needs to make consistent its intention to link the research in Phase One and its application by farmers and ranchers in Phase Two.

Phase Three is the sharing of data collected on agrivoltaic farming.

The Department supports proof-of-concept as the best way to determine the suitability of the to-be-determined agricultural activities to be researched and field trialed by HARC and interested farming operations at the Clearway Mililani solar facility.

The proposed agricultural activities (Appendix C, Figure 4, page 6) shows about 41 percent (250 acres) of the 610 acres available for agricultural uses may be in directly edible commodities such as honey, vegetable, sweet potatoes, and hydroponic lettuce. Another 19 percent (121 acres) will be in livestock grazing, presumably sheep, as cattle and goats are not mentioned.

Oahu Grazers has expressed interest in using a few hundred acres of the project site as additional pasture land for their sheep (500 head) and maybe calves. This operation already runs sheep on existing solar energy facilities on Oahu.

With respect to the market for sheep and lambs, the Department understands that Oahu’s primary livestock slaughter facility has expressed reluctance to offer services to hogs. The Department is not aware that this reluctance also applies to sheep and lambs. The Department recommends Oahu Grazers to confirm their agreement(s) with their slaughter facilities.

Mr. Dean Uchida
May 14, 2021
Page 7

While sales of sheep/lamb is not required by State law (Section 205-4.5(21), HRS), it is the generation of revenue by agricultural operators selling their agricultural products such as vegetables, melons, fruits, honey, and so forth that will ensure continued agricultural activity. This is why the Department focuses on the application's references and commitments to infrastructure, research, and field trials that affect agricultural operators and the establishment and continuation of their agricultural activities.

The Department has read the HARC Solar White Paper (Appendix B within Appendix C "Agricultural Plan") and has every confidence that this venerable Hawaii agricultural institution will follow through on their commitments to the best of their ability and produce data and information that will help those agricultural operators who are committed to the project site be economically viable.

Conclusion

The Department strongly encourages Mahi Solar to fulfill its commitments and assertions and go beyond the minimum statutory requirement of making the project site available for agricultural activities at a lease rate that is at least 50 percent below the fair market rent for comparable properties. The Department believes that research alone is not a satisfactory outcome, nor is sheep used only for weed control. The majority of the land area under the project site contains some of the State's most potentially productive soils for intensive agricultural production. The Department expects the research to be done by HARC along with the field trials with interested farmers to result in intensive agricultural activity on the project site.

Thank you for the opportunity to provide our input on this very important application. Should you have any questions, please contact Earl Yamamoto at 973-9466 or email at earl.j.yamamoto@hawaii.gov.

Sincerely,



Phyllis Shimabukuro-Geiser
Chairperson, Board of Agriculture

c: Office of Planning
Land Use Commission