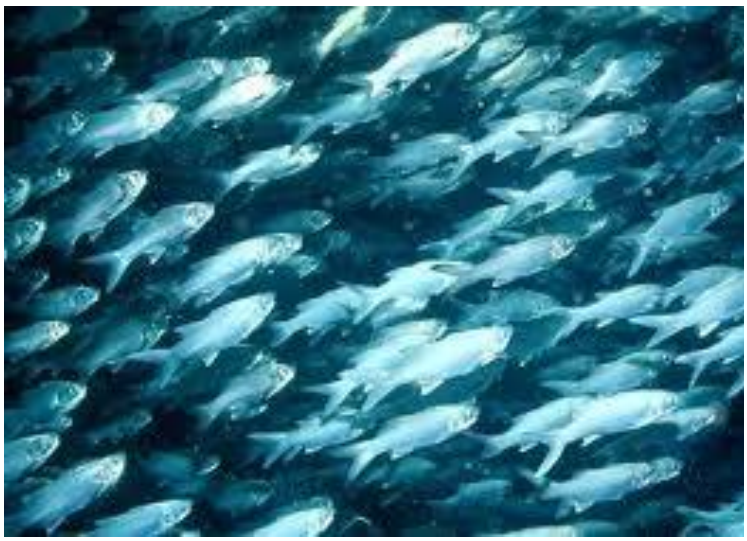
Conservation District Use Application

A Commercial Sea Cage Facility for Moi Aquaculture in the Reef Runway Borrow Pit in Keehi Lagoon, Honolulu, Oahu, Hawaii



Prepared for: Office of Conservation and Coastal Lands
Department of Land and Natural Resources

Prepared by: Aquaculture Planning & Advocacy, LLC
Kaneohe, Hawaii

Date: May 15, 2014

CONSERVATION DISTRICT USE APPLICATION *(CDUA)*
STATE MARINE WATERS

File No:	
Acceptance Date:	180-Day Expiration Date:
Assigned Planner:	

for DLNR Use

PROJECT NAME: A Commercial Sea Cage Facility for Moi Aquaculture

Conservation District Subzone: Resource

Identified Land Use: R-1 (D-1) Aquaculture, under an approved management plan
(Identified Land Uses are found in Hawai`i Administrative Rules (HAR) §13-5-22 through §13-5-25)

Project Address: In western portion Keehi Lagoon, the Reef Runway Borrow Pit, adjacent to the Honolulu International Airport, Moanalua, Honolulu, Oahu, and within the Borrow Pit

Total Area of Proposed Use: Approximately 75 acres

Total Area of Proposed Exclusive Use: Approximately 75 acres

Center Point of Leased Area: Latitude: N 21degrees 18' 07.16" Longitude: W157degrees 54' 43.47"

Nearest Tax Map Key(s): TMK: 1:1:03:por .05

Ahupua`a:Moanalua District: 7

County: Honolulu Island: Oahu

Proposed Commencement Date: January, 2015

Proposed Completion Date: January, 2018

Estimated Project Cost: $5.0 million

ATTACHMENTS

$ _____ Application Fee *(ref §13-5-32 through 34)*
$ _____ Public Hearing Fee *(if applicable; $250 plus publication costs; ref §13-5-40)*
☒ 20 copies of CDUA (*5 hard + 15 hard or digital copies)*
☒ Management Plan *or* Comprehensive Management Plan (*ref §13-5-39 and §13-5 Exhibit 3)*
☒ Draft / Final Environmental Assessment *or* Draft / Final Environmental Impact Statement

REQUIRED SIGNATURES

Applicant
Name / Agency: Mamala Bay Seafood, LLC
Street Address: 24 Sand Island Access Road, Box 27
Honolulu, Hawaii 96819
Contact Person & Title: John R. Cates
Phone: 808 841-4956 Fax:
Email: catesinternational@hawaiiantel.net
Interest in Property: Long-term lease , 45 years

Signature: _____ Date:
Signed by an authorized officer if for a Corporation, Partnership, Agency or Organization

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Agent
Agency: Aquaculture Planning and Advocacy LLC
Contact Person & Title: John Corbin, President
Mailing Address: 47-215 Iuiu Street
Kaneohe, Hawaii 96744
Phone: 808 239-8316 Fax:
Email: jscorbin@aol.com

Signature: _____ Date:

State of Hawai`i
Chairperson, Board of Land and Natural Resources
State of Hawaii
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809-0621

Signature _____ Date:

PROPOSED USE

Please provide an executive summary of the proposed land use. Attach any site plans, landscaping plans, photographs, maps and construction plans as needed.

Mamala Bay Seafood (MBS) proposes to locate a commercial aquaculture facility for the culture of the native species, moi, *Polydactylus sexfilis*, in the Reef Runway Borrow Pit (RRBP) adjacent to the Honolulu International Airport (HIA), Moanalua, Honolulu, Oahu (Fig. 1a,b and 2). MBS was formed by Mr. Randy Cates to carry out the proposed project. Mr. Cates previously owned and operated Cates International, Inc. which included an offshore aquaculture farm (also known as Hukilau Foods, LLC during part of its operation). For clarity, all further references in this document will be to MBS for the combined aquaculture activities of CI and MBS. A 45 year lease is being sought for approximately 75 acres of State marine waters that encompass the Borrow Pit (BP) – a steep-sided, dredged area that was created in the 1970s to provide fill for the Reef Runway. A large portion of the area (approximately 80% or 60 acres) is under the control of the Department of Transportation (DOT) by Executive Order and the balance (20% or 15 acres) is under the Department of Land and Natural Resources (DLNR) (Fig. 3). The BP site offers several important advantages for aquaculture; namely high water exchange with the open ocean, protection from high winds and waves, relatively deep water (45 ft to 50 ft deep), uniformly flat and depauperate silt bottom to anchor cages, minimal public use, and close proximity to the MBS shoreside base yard in Keehi Lagoon. See attached figures for location map, site plan and infrastructure photos.

The proposed fish farm will consist at full build out of an anchored grid of ten (10) Aqualine surface cages, manufactured by Aqualine AS, Trondheim, Norway. Each circular cage will be 114 ft in diameter and enclose a volume of approximately 264,860 ft^3 (7500 m^3) (Fig. 4). A small work platform surrounds the outside diameter of each cage to allow technicians to access the fish (Fig. 5 a,b). Projected annual farm production is estimated to be 1.5 M lbs, valued at $6.3 M.

It is anticipated that the netting for the cages will be a specially designed, semi-rigid woven copper alloy mesh or Dyneema fiber mesh or a combination of both (Fig.5 c, d). These materials have been in use by the global industry for many years. The copper alloy material is very strong and has proven very resistant to biofouling, thereby reducing the need for farm maintenance. The Dyneema fiber netting has likewise proven very strong and resistant to biofouling and breakage. Cages will be covered with nets to deter any bird interactions. MBS is requesting a feed/security barge be permanently moored (24/7) at the site (Fig. 4). Stocking, harvesting, feeding and maintenance will be carried out by surface work boats and barges frequently visiting the site, and occasional SCUBA diver assistance.

MBS desires that public access to the farm site be controlled and public use of the entire lease area be restricted due to safety, security and company liability concerns. It is being requested that no transit or anchoring of any boat or water craft, and no fishing, snorkeling or SCUBA diving be allowed within the lease area, except as provided by MBS. MBS will designate and mark a 100 ft wide transit lane along the inner and outer boundaries of the site to allow Airport Division (AD) access to the Reef Runway at any time and allow the public access to the outer reef during day time hours only; no public access at night to the entire site is being requested. A rule change

through the Division of Boating and Ocean Recreation (DBOR), DLNR to remove the 75 acre farm site from a larger State designated Thrill Craft Recreational Area will be needed to secure a long-term lease.

(For more project details, see the attached DEA).

CHAPTER 190D REQUIREMENTS

Pursuant to §190D-11, Hawai`i Revised Statutes (HRS), any person desiring to lease state marine waters shall submit to the board an application which contains the following:

1. An environmental assessment or, if required, and environmental impact statement which shall be prepared and accepted in compliance with the rules adopted under chapter 343.

   See attached EA.

2. A description of the location and boundaries of the state marine waters to be used and a description of the nature of the use desired.

   The project site is the Reef Runway Borrow Pit (RRBP) adjacent to the Honolulu International Airport (HIA), Moanalua, Honolulu, Oahu (Fig. 1 a, b). The area consists of an irregularly shaped, steep-sided, pit dredged to around 50 ft deep that was created in the 1970s to provide fill for the Reef Runway. The Borrow Pit is approximately 75 acres in total area and runs parallel to the Reef Runway. Approximate dimensions are: interior border length, parallel to the Reef Runway, of 5,002 ft; width of 1,292 ft at the widest point and 443 ft at the narrowest point (Fig. 1a, b).

   Site boundaries established by GPS are described by the following latitude and longitude coordinates in decimal degrees (See also numbering on Fig. 3)

   West End, North (1): 21° 18’ 9.70” latitude and 157° 55’ 12.81” longitude
   West End, South (3): 21° 18’ 6.76” latitude and 157° 55’ 12.92” longitude
   East End, North (2): 21° 18’ 10.60” latitude and 157° 54’ 24.77” longitude
   East End, South (4): 21° 17’ latitude and 157° 54’ longitude

   Notably the RRBP site, as classified by State Land Use Zoning, is entirely in the Conservation District, specifically the Resource Subzone. Jurisdiction over most of the proposed area (approximately 80%) was granted to the AD, DOT by Executive Order 3202. The balance of the proposed site (20%) is in State marine waters under the jurisdiction of DLNR. Administration of the proposed lease, should it be approved, is under preliminary discussion with the respective agencies, though DLNR administers other commercial uses in DOT airport EOs (Fig. 3).

3. A statement of the reasons for selecting the proposed location.

   MBS has significant experience working in Hawaiian ocean waters and specifically in

siting and hands-on operation of a commercial-scale fish farm under open ocean conditions (APA, 2009). To illustrate this further, the Company Principal, over the past ten years, has been called upon to consult on site evaluations for ocean cage culture projects in remote locations around the world, including the Marshall Islands, the People's Republic of China, South Korea, Ireland, and the Bahamas. MBS utilized this expertise to evaluate the RRBP as a suitable site for surface cage technology, taking into account such key siting factors as:

- **Reasonable protection from severe storms and high surf allowing use of surface cages.** The site is shielded on the seaward side by a large fringing reef that extends several thousand feet from shore.
- **Significant currents and water exchange and mixing.** MBS observed that daily, large volumes of ocean water continuously flowed over the reef flat into the RRBP, pushed by the wind and waves. Studies showed the ocean water inflow was mixed to the depth of the pit and continually excited through an eastern opening into the WCC and flowed back to the open ocean.
- **Water depth suitable for surface cages.** Depth of the steep-sided Borrow Pit was found to be dredged to a uniform depth of 45 ft to 50 ft, with little or no relief.
- **Bottom substrate suitable for anchoring cages.** The RRBP substrate was found to be flat and composed of fine silt less than a foot deep that would work well for anchoring cages.
- **Acceptable land influences on water quality.** The RRBP was found to not be significantly influenced by land runoff (e.g., three perennial streams in the area) due to its remote location and existing current patterns.
- **Compatibility with any protected species that may visit the area.** The RRBP is a highly disturbed and inappropriate habitat for most of Hawaii's protected species, with the exception of the green sea turtle (*Chelonia mydas*). Coral reefs are located in close proximity to the site and MBS has studied this issue in detail and finds it manageable.
- **Proximity of available harbor support facilities.** MBS noted the great advantages of this site with its closeness to the Company's existing shoreside facility and the 24/7 accessibility to the site through sheltered waters.
- **Manageable multiple uses.** Many years of MBS site observations indicate the recreational use of the interior of the site by the public, particularly where the cages would be located, is rare and the occasional use of the BP borders can be accommodated.

MBS concluded from the site evaluation, and preliminary discussions with the appropriate permitting agencies, that the Company has identified commercially available surface cage technology that can be scaled to sustainably and responsibly produce moi within the 75 acres of the RRBP. The site offers MBS an opportunity to continue to work in in commercial aquaculture, while providing an environmentally manageable and logistically superior location to an open ocean site.

4. A description of the activities to be conducted, including a specification as to whether such activities are commercial or noncommercial, a timetable for construction, deployment, and operation of facilities, and planned levels of production.

- Activities Description and Planned Levels of Production

MBS proposes to locate a commercial aquaculture facility for the culture of the native species, moi, *Polydactylus sexfilis*, in the Reef Runway Borrow Pit (RRBP) adjacent to the Honolulu International Airport (HIA), Moanalua, Honolulu, Oahu (Fig. 1a, b). A long-term (45 year) lease is being sought for 75 acres of State marine waters that encompass the Borrow Pit (BP) – a steep-sided, dredged area that was created in the 1970s to provide fill for the Reef Runway.

The proposed fish farm will consist at full build out of an anchored grid of ten (10) Aqualine surface cages, manufactured by Aqualine AS, Trondheim, Norway. Each circular cage will be 114 ft in diameter, 30 ft deep and enclose a volume of approximately 264,860 ft^3 (7500 $m^{3)}$. A small work platform surrounds the outside diameter of each cage to allow technicians to access the fish (Fig. 5a, b). Projected annual farm production is estimated to be 1.5 M lbs, valued at $6.3 M.

It is anticipated that the netting for the cages will be either specially designed, semi-rigid woven copper alloy mesh or Dyneema fiber mesh or a combination of both. The copper alloy material is very strong and has proven very resistant to biofouling, thereby reducing the need for farm maintenance. The Dyneema fiber has also proven very strong and resistant to biofouling. Mesh size will be one inch. Cages will also be covered with nets to deter any birds.

MBS is requesting a feed/security barge be permanently moored (24/7) at the site to store and distribute pelleted feed to the stock and provide a centralized hub for video surveillance of the farm. Stocking, harvesting, feeding and maintenance will be assisted by surface work boats and barges frequently visiting the site, with occasional SCUBA diver assistance.

MBS desires that access by the public to the farm site be controlled and public use of the entire lease area be restricted due to safety, security and company liability concerns. It is requested that no transit or anchoring of any boat or water craft, and no fishing, snorkeling or SCUBA diving be allowed within the majority of lease area. MBS will designate and mark a 100 ft. wide transit lane along the inner and outer boundaries of the site to allow Airport Division (AD) access to the Reef Runway at any time and allow the public access to the outer reef during day time hours only; no public access at night to the entire site is being requested.

- Timetable for Construction, Deployment and Start of Operations

In general, MBS proposes to begin construction and installation of the fish cages within the first six months after lease approval. In Phase I, the five cages in the eastern portion of the grid would be deployed; initially two cages would be anchored and within six months, three more (Fig. 4). The proposed start date is January, 2015, with fish in the cages by July, 2015 or sooner. The mooring grid and anchors for the initial five cage array will be

installed first. The floating ring portions of the cage will be assembled one at a time offsite near the Company's Keehi Lagoon base yard and towed to the site one at a time. The netting will be brought to the site by work boat and installed for each cage. Lastly, the feed/security barge will be placed.

Phase II, or deployment of the final five cages, would begin within three years of lease approval. Best case, the farm would be completed and fully operational by January, 2018 or sooner.
The detailed farm installation plan, with the estimated timeframes for various components, will be carried out as follows:

Phase I

Step 1: The mooring grid for the five cages, 14 anchors and the required cables, fasteners and lines will be installed followed by the mooring for the feed/security barge. Work boats with appropriate crane equipment for lifting and lowering heavy anchors will be used. (Timeframe - 5 days)

Step 2: The newly deployed anchor grid will undergo final adjustment of the tensions in the connecting system. (Timeframe- 2 days)

Step 3: The initial two floating cage rings will be assembled off site and towed to the RRBP one at a time. The cages will be connected to the mooring grid as recommended by the manufacturer. (Timeframe- 7 days)

Step 4: The feed/security barge will be towed to the site and installed at the appropriate grid location. (Timeframe- 2 days)

Step 5: The netting materials for each cage, either copper alloy mesh or Dyneema fiber mesh, will be assembled into net sections off site and brought to the site by work boat. Netting will be assembled and deployed for each cage, with the assistance of a boat-mounted crane and farm technicians and SCUBA divers. Attachment of the netting to the floating ring will be made using the brackets and connectors provided. (Timeframe- 10 days)

Step 6: Once cages and netting are in place, the feeding hoses will be run from the feed/security barge to the initial cages. (Timeframe- 1 day)

Step 7: Within 6 months an additional 3 cages will be added to the grid, by repeating the steps described above. (Timeframe- 14 days)

Phase II

Step 8: Within 3 years of approval and successful operation of the first five cages, installation of the remaining five cages and mooring system will be carried out in the more western portion of the site, as described above (Fig. 4). (Timeframe: 40 days)

In summary, the estimated installation time for the first 5 cage array in Phase I is approximately 41 days or less. Phase II could also take up to 40 days to deploy. Factors affecting these estimated timetables include: weather, scheduling of equipment and personnel and availability of fingerlings from the Company's hatchery for stocking.

5. A statement on the extent to which the proposed activities will interfere with the use of the state marine waters for the purposes of navigation, fishing and public recreation.

   MBS requests that access by the general public to the farm site be controlled and public use of the entire 75 acre lease area be restricted due to concerns over staff and the public's safety, farm security, efficient operation, and company liability. Specifically, the request is that no transit or anchoring of any boat or water craft, and no fishing, snorkeling, or SCUBA diving be allowed within the lease area; except as provided by MBS (see below). Further, it is requested that at night the general public be restricted from the entire site, including the transit lane. State officials, especially the AD of the DOT, will be able to access the site any time they deem circumstances warrant it, e.g., issues related to the Reef Runway.

   Another important use consideration concerns the proposed site being part of a State-designated 852 acre Thrill Craft Zone for riding jet skis. Through separate action, MBS will work with responsible State officials, i.e., Division of Boating and Ocean Recreation DBOR, DLNR and the affected community, for a rule amendment to remove the 75 acre farm site from the Zone, so that the State marine waters can be leased for commercial aquaculture. Preliminary discussions with the responsible State agency suggest such a change may be highly desirable for jet ski enthusiasts as they may be able to access a more suitable area.

   Past and MBS's recent observations of the Reef Runway Borrow Pit (RRBP) are indicate this rather remote area of Keehi Lagoon undergoes only limited use by the public for recreation, e.g. fishing, diving, riding water craft (BPI,2001; Appendix D,EA). The RRBP itself has been described as a highly disturbed and barren area that undergoes only limited boating activity of any kind, either as a destination or transit area to other locations (BPI, 2001; Appendix B and D, EA). Therefore, MBS believes that the restricted access being proposed will not be significantly disruptive to the Oahu boating public.

   MBS believes the observed lack of use of the RRBP and surrounding area by the public today stems largely from the following:

   - oceanographic conditions on the outer reef are often very rough;
   - the BP is a deep, dredged area of low productivity;
   - high noise levels of the airplanes using the Reef Runway; and
   - the popular belief that the area is a secure and "off limits" zone since the September 11, 2001 tragedy.

   MBS understands that the State AD, DOT requires quick access to the Reef Runway 24/7 to address any security or safety issues that may arise. Likewise, MBS further understands

that some members of the boating public may occasionally wish to access the seaward reef flat bordering the BP through the farm site to fish, paddle kayaks or dive. To accommodate these folks, MBS proposed to designate and mark a 100 ft wide transit lane along the inner and outer boundaries of the site. This portion of the lease site will be maintained by MBS and will facilitate daytime access only – not nighttime access – by the public to the seaward reef flat and importantly allow 24/7 access by the AD, DOT and other government officials to the Reef Runway area.

6. A description of any enclosure, fences, stakes, buoys, or monuments proposed to mark off the desired area.

   The basic farm infrastructure at full build out will be:
   - 10 commercially available Aqualine surface cages in a grid;
   - a mooring system connecting the 10 cages and anchored by 28 Danforth anchors; and,
   - a feed/security barge, 72 ft long connected near the center of the cage grid, with a single black feed hose running to each fish cage (Fig. 4).

   Since a high degree of exclusive use is being requested, MBS is aware it is important to clearly mark the site and its infrastructure and provide signage telling the public about the presence and extent of the private aquaculture farm. Importantly, the RRBP is clearly delineated visually by water depth and is not well used by the boating public.

   MBS proposes to mark the outer boundaries of the farm site with large, colored 48" buoys and appropriate signage describing the presence of the farm and the nature of the restricted access to the area. The transit lane around the edges of the BP will also be clearly marked by smaller buoys of a different size and color than the large boundary buoys. Further, the anchor, mooring and feeding lines crisscrossing the site will be marked at various places along their length with smaller buoys of difference colors to show the location of these lines.

   In addition, the cages and the feed/security barge will be clearly marked and lighted and if required, some of the buoys will be provided with approved lighting for nighttime awareness of the location of the site and infrastructure. As previously described (see Sec. 6.2.4, EA), MBS will make a concerted effort in the Keehi and Oahu maritime community to make recreational and commercial interests aware of the farm and the restricted access.

7. An initial description of current users (military, governmental, commercial, recreational and cultural) and their uses of the state marine waters requested for the lease, including any practitioners of traditional and customary Hawaiian rights.

   MBS has made 80 visits to the RRBP and the surrounding area from 2006 to 2013, with the purpose of making general observations on the suitability of the area for cage aquaculture, including understanding wave and current patterns, ambient water quality conditions, and use of the site by military, governmental, commercial, recreational and cultural users. A log was kept during these site visits which occurred various days of the week, various times of

day and during various weather conditions (see Appendix D, EA). In addition, previous use studies of the area were reviewed for pertinent information.

Access to the RRBP is by boat only. The results of MBS's observations can be summarized as follows:

- On 20% of the trips (16 times), fishing in the area was observed. On 69% of those occasions (11 times, the activity occurred on the seaward reef flat bordering the BP. On 21% of those occasions (6 times), the fishing occurred at the reef edge of the BP or at the Eastern entrance to the BP.
- On 6% of the trips (5 times), diving (mostly snorkeling) in the area was observed. On all occasions, this activity took place on the seaward reef flat adjacent to the BP.
- During these 80 visits to the site, no jet ski use of the BP was observed and on one occasion, a kayak was seen on the outer reef.

These observations, which are consistent with a previous user study of the area by Black Pearls Inc. for a pearl farm, support the conclusion that the RRBP and the seaward reef flat bordering it is lightly used by the public and the interior of the 75 acre Borrow Pit is not used at all, except for occasional boats transiting the area (BPI, 2001). The most frequent activity observed was fishing and the next most frequent was diving, but these pursuits did not occur in the interior of the RRBP where the fish farm would be located. These occasional activities usually occurred on the outer reef flat of the RRBP, which is a much more interesting and productive environment. The exception is fly fishing which is known to occasionally occur on a portion of the inner reef flat border adjacent to the Reef Runway.

MBS believes from casual conversations with members of the boating community that this lack of use of the RRBP by the public today probably stems largely from the following:

- the Borrow Pit being a dredged area of known low productivity;
- the noise levels of airplanes in the Reef Runway area; and
- the popular belief in the marine recreational community that the RRBP is a restricted zone since the September 11, 2001 tragedy and off limits.

While specific observations of the use of the RRBP for traditional and customary gathering by native Hawaiians were not made, no such activity was seen. MBS suggests the same site characteristics noted above that limit site use by the general public would also apply to limit use by native Hawaiians for traditional and customary gathering. The low use of the area by the public contributes to making the RRBP a very suitable site for a commercial aquaculture cage farm.

EVALUATION CRITERIA

The Department or Board will evaluate the merits of a proposed land use based upon the following eight criteria *(ref §13-5-30 (c)):*

1. The purpose of the Conservation District is to conserve, protect, and preserve the important natural and cultural resources of the State through appropriate management and use to

promote their long-term sustainability and the public health, safety, and welfare. (*ref §13-5-1)* How is the proposed land use consistent with the purpose of the conservation district?

Aquaculture, including ocean aquaculture in State marine waters, is a permitted use in the Conservation District by rule and is consistent with the purpose of two of the five subzones in the Conservation District, i.e., the Resource and General Subzones. In general, well-managed and environmentally sustainable commercial aquaculture in State marine waters can provide a number of important public benefits that enhance public welfare, including:

- increased supply of high-quality, locally-produced seafood to address greater state food security;
- good jobs for qualified residents;
- stimulation of the local economy through purchase of equipment, supplies and services; and
- payment of lease rents to the State.

In addition, a large-scale private moi hatchery, which will be developed at a separate location, could allow for a public-private partnership for wild stock enhancement of this popular fish species, as well as research on other species.

2. How is the proposed use consistent with the objectives of the subzone of the land on which the land use will occur? *(ref §13-5-11 through §13-5-15)*

   All State marine waters are in the Resource Subzone and aquaculture, including ocean aquaculture, is a permitted use by rule in the Resource Subzone and consistent with the stated objective for this subzone, "to develop, with proper management, areas to ensure sustained use of the natural resources of those areas."

3. Describe how the proposed land use complies with the provisions and guidelines contained in chapter 205A, HRS, entitled "Coastal Zone Management" *(see 205A objectives on p. 8).*

   Chapter 205A provides for the following objectives and policies related to open ocean aquaculture. Project compliance with these provisions and guidelines is described after each item in parentheses.

   (b) Objectives

   (1) **Recreational resources:** Provide coastal recreational opportunities accessible to the public.

   (The RRBP receives only limited public use according to observations made by MBS and others. The project intends to restrict public boating, fishing and diving within the 75 acres of the RRBP during daylight and nighttime hours due to operational security, safety and liability concerns. To compensate, MBS will provide a well-marked 100 ft wide transit lane around the border of the RRBP to permit the interested boating public access to the inner and seaward reef flat areas as needed.)

(2) **Historic resources:** Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

(This project will not affect historic resources as previous surveys indicate there are none in the area (Appendix E, EA).

(3) **Scenic and open space resources:** Protect, preserve, and where desirable, restore or improve the quality of coastal and scenic open resources.

(This relatively low physical profile project, approximately 8 ft above the ocean surface at the highest point (the feed barge), will not affect scenic and open space resources as it is located in near shore State marine waters adjacent to the Honolulu International Airport (HIA) Reef Runway, a highly industrialized area).

(4) **Coastal ecosystems:** Protect valuable coastal ecosystems, including reef, from disruption and minimize adverse impacts on all coastal ecosystems.

(This project is located in a 75 acre dredged area of the western portion of Keehi Lagoon. the RRBP that was created in the 1970s to provide fill for the HIA Reef Runway [Fig. 1a, b]. The BP is between 45 and 50 ft deep, with steep vertical walls and a more or less flat bottom covered with a thin layer of fine silt. Its bottom is devoid of relief that would tend to attract marine life and the benthos is barren [Appendix C, EA].

While the interior of the BP itself is barren, the seaward border is designated a reef flat by the National Ocean Service (NOS), made of a Spur and Groove structure [see Sec. 5.4.3, EA]. Coral coverage on the broad outer reef flat, is spotty and NOS indicates coralline algae is the dominant cover [see Sec. 5.4.3, EA]. MBS's Biological Assessment of the BP area confirms the NOS survey and indicates the edges of the BP and the shallow portion of its walls does have a diverse collection of coral species present [see Appendix B, EA].

MBS believes that the aquaculture project will not have significant impacts on the reef flat surrounding the BP or the corals on the edge of the pit. Relevant to this point, current studies indicate the predominant water flow pattern is from the open ocean, over the outer reef flat and into the BP. There, BP water mixes top to bottom and then moves easterly out of a 480 ft gap in the reef to the Water Circulation Channel [WCC], which is carrying Keehi Lagoon water out to Mamala Bay and the open ocean. This strong consistent current pattern will suspend and disperse fish metabolites and excess feed for recycling and reuse by the ecosystem [Appendix A and B, EA].

MBS will institute a comprehensive program to monitor farm impacts on water quality, substrate quality, and coral health as required by responsible agencies [see

Sec. 6.2.2, EA and Appendix C, EA]. MBS will use available BMP's to manage farm nutrient levels and apply mitigation measures if excess nutrients are observed [see Sec.6.2.1, EA].

Further, the cage and mooring infrastructure is designed for open ocean conditions and very sturdy. Failure of cages or moorings that would damage the environment is highly unlikely. Work boats will stay a safe distance from the reef edge.)

(5) **Economic uses:** Provide public or private facilities and improvements important to the State's economy in suitable locations.

(This aquaculture project will provide skilled employment opportunities and expenditures in the local support industries, as well as, increase the availability of high-quality seafood in the local markets. These benefits will result from conducting environmentally sustainable ocean farming at a very suitable site, utilizing proven technologies and best management practices.)

(6) **Coastal hazards:** Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

(The MBS farm is located in an area, the RRBP, protected from high surf by the large seaward fringing reef. The farm itself is low profile for high wind, the highest point, the feed barge, being 8 ft above the sea surface. In the rare instance of a potential tsunami, cages and mooring will be firmly secured prior to arrival.)

(7) **Managing development:** Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

(Not applicable to this project.)

(8) **Public participation:** Stimulate public awareness, education, and participation in coastal management.

(MBS has plans to offer an internship program for college and high school students.)

(9) **Beach protection:** Protect beaches for public use and recreation.

(Not applicable to this project.)

(10) **Marine resources:** Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

(The project will develop and use Hawaii's marine resources to produce local food in a productive and economically beneficial manner that is environmentally and

economically sustainable. Environmental monitoring (water quality, benthos, and corals) of the site will be carried out as required. Opportunities for restarting a moi stock enhancement program and establishing a corals nursery for restoration purposes would be possible through public/private partnerships.)

4. Describe how the proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region.

   In general, there are three major areas of concern with this aquaculture project regarding causing substantial adverse impact to the surrounding marine environment. They are:
   - physical damage from work boats and breakaway cages;
   - accumulation of excessive nutrients from feed and waste products; and
   - release of potentially harmful feed additives.

   MBS work boats will stay a safe distance from the seaward reef and there is ample room to maneuver. The Aqualine surface cages and mooring systems being used are very sturdy and have been in use for many years around the world in exposed, high energy near shore and offshore locations, unlike the sheltered location for this project. Cage stocking densities will be at the low end of industry standards for this project to promote faster fish growth and waste production (particulates and dissolved) should be very manageable based on the site hydrodynamics and frequent turnover of RRBP water (Appendix A, EA). Lastly, MBS will not be using feed additives such as antibiotics and any disease treatments would be pre-approved by State officials (see Sec.3.1.2, EA.)

5. Describe how the proposed land use, including buildings, structures and facilities, is compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.

   The infrastructure for the fish farm will consist of 10 large surface cages with copper mesh or Dyneema fiber netting connected by a sturdy mooring system anchored in place (Fig. 4). The surface cages will be encircled by a work platform approximately four feet above the sea surface. In addition, there will be a feed/security barge, approximately 74 ft long, 24 ft wide, and 8 ft high, anchored more or less in the center of the grid. Boat traffic to and from the farm will appear as normal activity. Overall, the fish farm will have a low profile as seen from the nearby HIA property and the distant upland residential housing that is consistent with, and not unlike, the several islands and other structures in Keehi Lagoon (Fig. 1a, b). Further, it is consistent with the three designated deep water anchorages off the RRBP that are used by large ships waiting to enter Honolulu Harbor (see Sec.5.7, EA).

6. Describe how the existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon.

   As described above, the fish farm will have a low profile, as seen from nearby the HIA property and the distant upland residential housing, which is consistent and not unlike the several islands and business structures in Keehi Lagoon. Keehi Lagoon itself is a very active area that undergoes frequent recreational use. MBS believes that, considering the

location of the RRBP is the western-most portion of Keehi Lagoon and directly adjacent to the Reef Runway, the aquaculture structures will not significantly affect the existing "natural beauty" and open space characteristics of the site.

7. If applicable, describe how subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District.

   Not applicable.

8. Describe how the proposed land use will not be materially detrimental to the public health, safety and welfare.

   Aquaculture use of the near shore marine environment will not be materially detrimental to the public health, safety and welfare. It is noted that studies indicate the area is not frequently used by the public. Regardless, MBS is requesting that access by the public to the farm site be highly controlled and public use of the entire lease area be restricted due to public and staff safety, security and company liability concerns. Specifically, MBS is asking that no transit or anchoring of any boat or water craft, and no fishing, snorkeling or SCUBA diving be allowed within the majority of the lease, in part to safeguard the public. MBS will designate and mark a 100 ft wide transit lane along the inner and outer boundaries of the site to allow Airport Division (AD) access to the Reef Runway and accommodate the modest public interest to access the seaward reef through the site during daytime hours only; no public access at night to the entire site is requested. MBS will mark the entire farm site boundary and the transit lane mentioned above. In addition, signage explaining these restrictions will be posted and communicated by the MBS president to the Keehi boating public.

CULTURAL IMPACTS

Articles IX and XII of the State Constitution, other state laws, and the courts of the State require government agencies to promote and preserve cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups. (The DOH, Chapter 343, HRS, requires an EA/EIS to discuss cultural resource in determining the significance of a proposed project.)

Please provide the identity and scope of cultural, historical and natural resources in which traditional and customary native Hawaiian rights are exercised in the area.

Mamala Bay Seafood (MBS) is proposing to locate a commercial aquaculture facility for the culture of the native species, moi (*Polydactylus sexfilis*) in the Reef Runway Borrow Pit (RRBP), adjacent to the Honolulu International Airport (HIA), Honolulu, Oahu. A long-term lease is being sought for 75 acres of State marine waters that encompass the Borrow Pit (BP), a steep-sided dredged area that was created in the 1970s to provide fill for construction of the HIA Reef Runway. The construction of the Reef Runway essentially split Keehi Lagoon into two parts, the western part, or Hickam Harbor side, and the eastern side, or the Sand Island/Honolulu Harbor side (Fig. 1a, b).

HIA and the RRBP lie within the seaward portion of the Moanalua Ahapua`a. By the time of early western visitors to the Hawaiian Islands late in the eighteenth century, there was a large population of native Hawaiians living there; farming the rich soil, fishing in the shallow lagoon, and constructing stone fishponds (loko kuapa) unique to Hawaii.

The next 150 years saw great change in the Moanalua coastal lands. By the 1880s, much of the area was turned to pasture and significant portions leased to sugar, rice and banana growers. The Navy's base at Pearl Harbor was built up with the aid of extensive dredging and deposition of spoils in lowlands, and John Rodgers Airport (now HIA) was dedicated in 1927. With the advent of World War II in the 1940s, further great physical change was evident. Three large sea plane runways were dredged in Keehi Lagoon (see Appendix E, EA) and Kalihi Channel had been widened and deepened.

The inescapable conclusion is the RRBP, and the surrounding Keehi Lagoon environments, have been highly disturbed by development (Table 1, EA). Since the advent of the legal requirement in 1968 to conduct environmental assessments for significant projects, many studies have been carried out for construction projects at HIA and the vicinity. None have noted significant cultural resources at or near the RRBP (see Sec. 5.8, EA). MBS's recent surveys of the BP site confirm this conclusion (see Appendices D and E, EA).

Further, MBS's nine-year use survey, discussed in Appendices D and E of the EA, suggests the farm site does not contain culturally significant natural resources that would be subject to traditional and customary native Hawaiian gathering rights i.e., no observations of such activities were made. This conclusion is also supported by an earlier use and user study (BPI, 2001). MBS's environmental studies indicate the man-made BP is largely devoid of macro-fauna and –flora, except for shallow portions of the pit walls (see Appendix B, EA).

Notably, MBS will be designating and marking a 100 ft wide transit lane along the boundaries of the entire site so that the interested public, including native Hawaiians, can access the outer and inner reef flats by boat (see Sec. 6.2.4, EA).

Identify the extent to which those resources, including traditional and customary Native Hawaiian rights, will be affected or impaired by the proposed action.

MBS is proposing restrictions on the access and use of the RRBP for staff and public safety, site security and company liability concerns. It is being requested that no transit or anchoring of any boat or water craft, and no fishing, snorkeling or SCUBA diving, be allowed within the lease area, except as provided. Further, MBS is requesting no access to the entire RRBP site during nighttime hours. As such, access to the RRBP will be prohibited to a large extent.

MBS is cognizant of the need for the Airports Division (AD) of DOT to have 24/7 access to the Reef Runway and potential for some members of the boating public to want access to the outer reef, seaward of the BP for recreation. The Company is proposing to designate and mark a 100 ft wide transit lane along the inner and outer boundaries of the site. There would be no anchoring of any water craft in this area due to the possible presence of farm anchor lines at

depth and no nighttime use per the previous discussion. This access lane would serve the general public and native Hawaiians who wish to access the more productive environs of the outer reef flat.

What feasible action, if any, could be taken by the BLNR in regards to your application to reasonable protect native Hawaiian rights?

No specific action is required by BLNR to reasonably protect native Hawaiian rights. MBS requests that the BLNR approve the site restrictions and mitigation actions (the transit lane, etc.) being proposed in light of:

- the apparent low use profile for the RRBP site;
- its low productivity; and
- the Company's significant concerns over safety, security and liability.

MBS will make it a priority to broadly communicate, including appropriate signage, these site access restrictions to the marine community in Keehi Lagoon and at large.

REQUIREMENTS APPLICABLE TO MARICULTURE FACILITIES

Proposed Species to be Cultivated: Moi or Pacific Threadfin, *Polydactylus sexfilis*

Total number of Proposed Cages: Anchored grid of ten (10) cages (Fig. 4).

Volume of Proposed Cages: Each cage is 114 ft in diameter, with a volume of 264,860 ft^3 or 7,500 m^3 (Fig. 5 a,b,c,d). Ten cages would have a total volume of 75,000 m^3.

Total Capacity of Proposed Cages: Maximum stocking density per cage will be managed to be approximately 10 kg/m^3 at harvest time or 165,000 lbs of fish. Maximum farm capacity theoretically is 1,650,000 lbs per year based on a one year grow-out cycle.

In reality, the farm should never reach total standing stock biomass of 1,650,000 lbs. MBS will stagger the availability of cages for harvest, i.e., there will be fish at different stages of the grow-out cycle and hence different sizes in each cage so that markets can be serviced all year round.

Another factor is the time for grow out to market size at the water temperature of the BP should be about seven months. MBS will also be starting new cages at various times during the year. Therefore, for purposes of business planning, the estimated figure of 1.5 M lbs per year is used.

Describe type of cages to be used: After considerable research, MBS chose the Aqualine Froya Ring FR 400-100 surface cages made by Aqualine AS, Trondheim, Norway (fig. 5a, b). The very sturdy offshore cage design used in Norway and around the world for many years is structured of flexible, high strength, UV resistant plastics, steel brackets, and floating tubes, stays and chains. A single cage is circular in shape, 358 ft in circumference and 114 ft in diameter (Fig. 5a). Each cage has a 4 ft high handrail that goes around its entire circumference (Fig. 5b).

Cage netting will be either a semi-rigid, woven copper alloy mesh of about one inch or Dyneema fiber netting of the same size mesh, or a combination of both (Fig. 5c, d). Both materials have proven very strong and durable in the harsh marine environment and both netting materials are known to be resistant to biofouling. Nets will hang to a depth of 30 ft.

The mooring grid designed by the vendor will consist of steel brackets, bridles, heavy-duty lines and chains, and 28 Danforth anchors that are 3,000 lbs to 6,000 lbs in weight.

Please provide a summary of facility operations (i.e., species specific information including but not limited to biology, breeding, stocking, and harvesting; feeding methods; known diseases and treatment methods; maintenance and cleaning methods; and amount of wild broodstock needed.)

Relevant species specific information is summarized below (see also Sec. 3.1, EA) :

Biology: Moi, *Polydactylus sexfilis*, is a bottom feeder that can be found in shallow, sandy areas around the Hawaiian Islands. It can attain a length of 24 inches and a weight of 9.5 lbs. Regional distribution of the species includes Hawaii and the Indo West Pacific.

Pacific Threadfin are protandric hermaphrodites, maturing as males at age 5-7 months and changing to females as early as 1.5 years of age. The fish spawns naturally in captivity approximately once per month for 3-6 consecutive days and can spawn all year round. There is no commercial fishery for the species in Hawaii due to low numbers in the wild.

Breeding: Stocking material, fingerling moi, will be produced from captive broodstock in a land-based hatchery, location to be selected. No selective breeding is planned. Broodstock will be sourced periodically from the wild, such that fingerlings will be F-1 generation, or essentially genetically wild fish.

Stocking: Fingerlings, approximately two to three inches in length (two to three months old), will be transported by truck in tanks to the Company's Keehi Lagoon shoreside facility for loading into a boat with specially constructed transport tanks. Upon arriving at the lease site, stock are gently distributed into submerged cages, using hoses that carry fish and sea water into the cage (see also Sec. 3.1.2, EA). Initial stocking density will be approximately 150,000 individuals per cage. Fish will be held in a smaller net (nursery net) within the larger cage net for a period of time to facilitate feeding.

Harvesting: Harvesting of market-sized fish of about 1 to 1¼ lbs utilizes a customized surface vessel and commercially available fish pump to move fish from the cage to fish wells on the boat. Divers inside the cage "herd" marketable fish to a portion of the cage, where they are gently pumped to the deck of the support vessel. On the vessel, fish slide into one of two large ice-brine slurry baths to quickly disable them with minimum damage. Fish are then transported whole in the slurry to MBS's Keehi Lagoon facility for off-loading into containers that are destined for a local wholesaler. No fish processing occurs at sea during harvests and solid waste disposal is the responsibility of the wholesaler and other buyers that process the fish.

Feeding methods: Feeding of the farm stock will occur daily from the electronically controlled, central feeding barge. The barge will store a two-week supply of pelletized, sinking feed, a portion of which will be distributed to each cage daily through hoses that carry seawater and feed pellets into the cage. Feeding schedules and quantities will vary per cage depending on the biomass present. Feed pellets will be spread widely in a cage to facilitate consumption by all stock and to minimize wastage. The feed distribution will be electronically controlled and monitored by video cameras and divers, so as not to over feed and minimize uneaten pellets. The Company has a strong economic incentive to carefully manage feed consumption and minimize wastage because it is the highest contributing unit cost to each unit of fish production.

The feed that will be used is a commercially available, specially formulated slow sinking marine fish diet shipped in bulk from a mainland manufacturer, Skretting Inc. The pellets are a mixture of fish meal (sustainability sourced), agriculture grains and a vitamin/mineral mix, with a crude protein content of approximately 43%. No additives, such as hormones or antibiotics, will be used. Feed Conversion Ratio (FCR), feed fed divided by the fish produced, has averaged 2:1, generally considered acceptable for culture of a new marine fish species (see also Sec. 3.1.2, EA).

Known diseases and treatment methods: Offshore aquaculture of moi in Hawaii has not identified any pathogenic disease issues leading to stock mortality to date. MBS is striving to be a leader in marine finfish biosecurity in Hawaii. The Company will apply best management practices to its operations, including inspection of fingerlings for disease prior to stocking, maintaining controlled feeding rates, utilizing acceptable stocking densities, and regular removal of fish mortalities and cage cleaning.

Stringent biosecurity procedures, adapted from large-scale marine hatcheries in Europe, will be adopted at the MBS hatchery, including highly controlled access to the facility by visitors and managed movement of staff within the facility. Plans for the new farm include instituting disease testing at three stages of the grow-out process: 1) stock going into the cage, 2) at 4 months into the grow-out; and 3) just before the fish are harvested. Should a disease event occur in the stock, State authorities (DLNR, DOA and DOH) will be notified and approved treatment and stock disposal procedures for aquatic species will be carried out.

Maintenance and cleaning methods: Cage maintenance is if three types: 1) inspection of stock for mortalities and their removal; 2) repair of various cage components, including connecting lines and cables, the anchor system, and the net enclosure; and 3) cleaning of the cage netting and mooring lines. According to the manufacturer, the design life of farm structural components is 15 years for the cage components and 20 years for the mooring system. However, due to the possibility of mechanical wear, lines would be inspected on a biweekly to monthly interval.

Cage netting for all the cages will be a copper alloy mesh or high-strength Dyneema fiber netting or a combination of both. Both materials are in use around the world for ocean aquaculture because of their durability in the marine environment. While both materials are

resistant to biofouling, the copper alloy mesh has proven very resistant and requires only occasional cleaning. The copper alloy material has a service life of around 10 years and the Dyneema mesh about 15 years. Regardless, netting will be inspected regularly. If major repairs are needed, netting will be replaced. Minor repairs can be accomplished by divers, while the cage remains submerged.

Cleaning of attached algae and other marine growth on the cages will be carried out by divers using a commercially available Power Washer that utilizes a jet of water to dislodge material. Regular cleaning is important for the free flow of new seawater through the netting. Experience suggests that cleaning every cage approximately every two to three months will keep attached marine growth to a minimum and maintain water circulation. No chemical are used in the cleaning process. Pulverized material will be readily suspended and dispersed by the strong and consistent currents in the RRBP (particularly the erosive bottom current, see Appendix C) and assimilated and recycled by the ocean environment.

Amount of wild broodstock needed: Broodstock for the hatchery will be replenished generally once a year by capturing up to 100 juvenile and adult fish. This amount of fish is needed because moi are protandric hermaphrodites, that is, they start off life as a male and at a certain size become a female capable of egg production. Thus, in order to have a sufficient ratio of males to females for reproduction, about a 100 fish are required to be kept in the hatchery.

In addition, broodstock to produce fingerlings for stocking can be sourced by MBS from various locations around the main Hawaiian Islands. It is known that moi around the Islands are genetically the same and represent one population (see Sec.3.1.2, EA). Therefore, fingerlings produced from these fish would be genetically the same as wild fish.

Describe the environment at the project site, including the benthos and any coral reefs. Locate and identify threatened and/or endangered species.

Briefly, the RRBP is a 75 acre portion of the western portion of Keehi Lagoon adjacent to the HIA (Fig.1a, b). The BP was created in the 1970's by extensive dredging of the fringing reef to a depth of between 45 ft. to 50 ft. to obtain fill to construct the Reef Runway. The RRBP is bordered on its landward side by an inner reef fragment adjacent to the Reef Runway and, on its seaward side by a broad outer reef flat exposed to open ocean wind and wave conditions (Fig. 2).

The BP is border on the west by an extension of the fringing reef, while the eastern corner is dominated by a 480 ft. gap that leads into the Keehi Lagoon , Water Circulation Channel (WCC) (Fig. a, b). The WCC, which is around 400 ft. wide and 45 ft. deep, was constructed to improve circulation and water quality in Keehi Lagoon.

The observed hydrodynamics of the RRBP, as confirmed by several MBS studies, are nearly constant unidirectional flow of water from offshore over the seaward outer reef flat and into the BP, where it moves eastward to the WCC and out to Mamala Bay and the open ocean. Average current speeds are estimated at 4 cm/sec. to 6 cm/sec, provide turnover frequencies of BP water

of 4 to 6 times per hour or 96 to 144 times in a 24 hr. period (Sec.5.3.1 and Appendix A and B, EA).

Importantly, water analyses (e.g., temperature, salinity, oxygen saturation and nutrients) of the RRBP show that the incoming open ocean coastal water enters the BP over the reef flat and is mixed by wind, wave and current from sea surface to the bottom, as it moves eastward to exit into the WCC. MBS describes this pattern as ocean water leaving the RRBP as a "wall of water" that joins the WCC circulation as it moves to the open ocean. This pattern maintains oceanic water quality in the BP (Sec. 5.3.1 and Appendix A, EA).

The bottom of the RRBP is characterized as uniformly flat, devoid of relief and covered by fine silt. Samples from six stations yielded no living organisms, and reflected the characteristics of near shore sites that are inside protective outer reefs. Results indicate sites are exposed to a high level of tidal currents, as well as energy, and the resulting mixing drives homogeneity of sediment structure (Sec. 5.3.2 and Appendix C, EA). This is consistent with the conclusion that the RRBP is well mixed system with an erosive sea floor subject to strong currents.

The RRBP is bordered on the ocean side by an area classified as Reef Flat by the National Ocean Service. Further, the structure is termed Spur and Groove, having a habitat of alternating sand and coral formations that are oriented perpendicular to shore. The MBS Biological Assessment surveyed corals and other marine life along the BP edge/wall as well as the nearby reef flat. Corals on the shallow reef flat were primarily small and scarce. Corals growing on the edges and shallow vertical walls of the pit comprised a relatively diverse community of colonies of 10 different species; four considered abundant. Species and abundance of fish, invertebrates and macro algae were typical of a Hawaii reef system (Appendix B, EA).

The RRBP site and its vicinity have several threatened and/or endangered species to note. The coral survey noted the presence of an endemic species, *M. putula*, which is a candidate for Endangered Species status, though no decision has been made. Green sea turtles (*Chelonia mydas*) have been observed on occasion in the BP, along the walls, and MBS's experience is that farming operations will not significantly affect turtle behavior. Lastly, the Hawaiian Stilt, (*Himantopus mexicana knudseni*) is occasionally seen on the islands in Keehi Lagoon were it feeds. Review of the scientific literature indicates the BP habitat and aquaculture cages (which will be covered) would not be acceptable habitat for the species (Sec.6.2.2, EA).

Discuss the applicant's related expertise, research, planning efforts, similar projects completed or participated in and other related projects previously or currently undertaken that aid in the conduct of the proposed project. Provide relevant project results, if applicable.

MBS is owned by John R. (Randy) Cates and has been in business in Hawaii since January 1, 2000 as an all-purpose ocean-focused enterprise conducting such activities as fishing, vessel salvage, various commercial and research charters, coral reef restoration, and a variety of jobs for the military. Prior to his formation of MBS, Mr. Cates had a distinguished career as a

civilian contractor with the Department of Defense that involved among other things, dolphin training..

In 2000, MBS became the first company to receive an ocean lease of State marine waters under Hawaii's amended law, Chapter 190D, HRS. It was also the first commercial Open Ocean Aquaculture (OOA) lease in the nation. Previously, the company had gained a wealth of experience from participation as the operating partner in the federally funded, comprehensive multi-year cage culture research and demonstration project, the Hawaii Offshore Aquaculture Research Project (HOARP), which began in April, 1999 and demonstrated commercial scale sea cage culture at a site several miles off Ewa Beach, Oahu..

Based on its first-hand experience as part of the HOARP team, MBS sought a commercial lease adjacent and seaward of the research project. MBS received a CDUP and lease authorization from DLNR in 2001. The site was 28 acres in area for operations of four cages to grow the native species moi (*Polydactylus sexfilis*). During the first six years of operation under Mr. Cates, MBS made major contributions to developing the innovative technologies and management approaches (e.g., submerged cage culture and automated feeding system) that have allowed commercial fish farming in the open ocean to develop in Hawaii and nationally.

In 2006, the MBS fish farm was acquired by Grove Farm, a well-known Kauai-based agribusiness firm, and rebranded the operation as Hukilau Foods LLC (HF). Mr. Cates remained part owner of the farm and became its Chief Operating Officer, carrying out all planning and development, and maintaining both a land-based hatchery and the four-cage offshore production unit. During Mr. Cates' operating tenure, the farm produced over 1,000,000 lbs of moi. In 2010, he officially left HF as CEO and the operating partner due to a dispute with his other partner.

Since 2010, Mr. Cates has continued to operate his marine operations business consisting of dockage and a shop at Sand Island. He has been hired to carry out a variety of aquaculture, Navy, salvage, marine construction, tsunami recovery, and coral reef recovery projects, while looking for new farm opportunities in the aquaculture industry. MBS is now seeking a lease for a site that encompasses the 75 acre RRBP.

In recent years, it should be noted that Mr. Cates is a Board Member of the Hawaii Aquaculture and Aquaponics Association and from 2007 to 2013 was a member of the Marine Fisheries Advisory Committee that advises the Secretary of Commerce and NOAA on national fisheries and aquaculture policy.

List each proposed structure, project element and use. Indicate the area required for each individual structure. Indicate the duration for each structure, project element or use. Plan an overall site plan that shows the location of the structures or elements of the proposed uses in relation to the surrounding environment.

The major structures and their uses are as follows:

a) Sea cages are each 10,208 ft^2 in surface area and 10 cages will encompass an area of 2.34 acres (Fig. 4). Cages will be stocked with fingerling moi to grow out to market size in about seven months. Fish will be harvested by boat and transported to shore chilled on ice for sale. Operational life of the Aqualine cage structural elements is about 15 years and for the proposed netting materials, it is 10 years (copper alloy) to 15years (Dyneema). Each cage will be surrounded by a 4 ft. high walkway to allow access by technicians to the fish. The total surface area of all the cages, and a feed barge (0.05 acres) located in the approximate center of the cage array, will be 2.39 acres (Fig. 4).

b) The mooring grid designed by the vendor will consist of steel brackets, bridles, heavy-duty lines and chains, and 3,000 to 6,000 lb Danforth anchors. Service life is about 20 years. It will occupy approximately 59 acres and be permanently located for the life of the project to attach the cages. The 28 anchors will occupy a total bottom area of about .025 acres. A site plan is found in Fig. 4.

c) The requested feed/security barge will be permanently moored on site, approximately in the center of the grid. In addition to a two week supply of feed it will house security equipment. The specially constructed barge is 74 ft long by 24 ft wide, with a surface area of about 0.05 acres (see also Sec. 3.1.2, EA). The barge will be in use for the life of the project.

Key operational elements of the farm are as follows (see Sec. 3.1.2, EA for more details):

a) Stocking: Stocking will be carried out from surface vessels that will distribute hatchery raised moi fingerlings to the cages using pumps and large hoses to gently transport fish. Stock will be given a health inspection prior to transport. The stocking process will be observed by SCUBA divers and video cameras.

b) Feeding: Feeding will be carried out daily from the permanently anchored feed/security barge that will store large volumes of feed. Amounts distributed per cage will depend on the stage of the grow-out cycle the fish are in. Slow sinking feed pellets purchased on the mainland will be distributed on appropriate schedules to all cages. Feeding the fish to satiation (a state when there is no more consumption) will be monitored by SCUBA divers and video cameras to avoid overfeeding.

c) Harvesting: SCUBA divers will enter the cage and "herd" market-sized fish to the mouth of a hose, where they will be pumped to the surface. There they will be directed to a transport vessel with tanks filled with an ice/brine slurry to preserve fish quality for the ride to the off loading dock at Sand Island.

d) Maintenance: Technicians and SCUBA divers will be inspecting cages and mooring systems on a regular basis and any potential problems with netting, lines or fasteners will be fixed on site if possible. Approximately every two months, or as needed, a power washer will be used to clean cage netting in place to facilitate passage of new ocean water through the cage. SCUBA divers will utilize a brush and water jet to clean off and pulverize any attached plant and animal material.

FIGURES

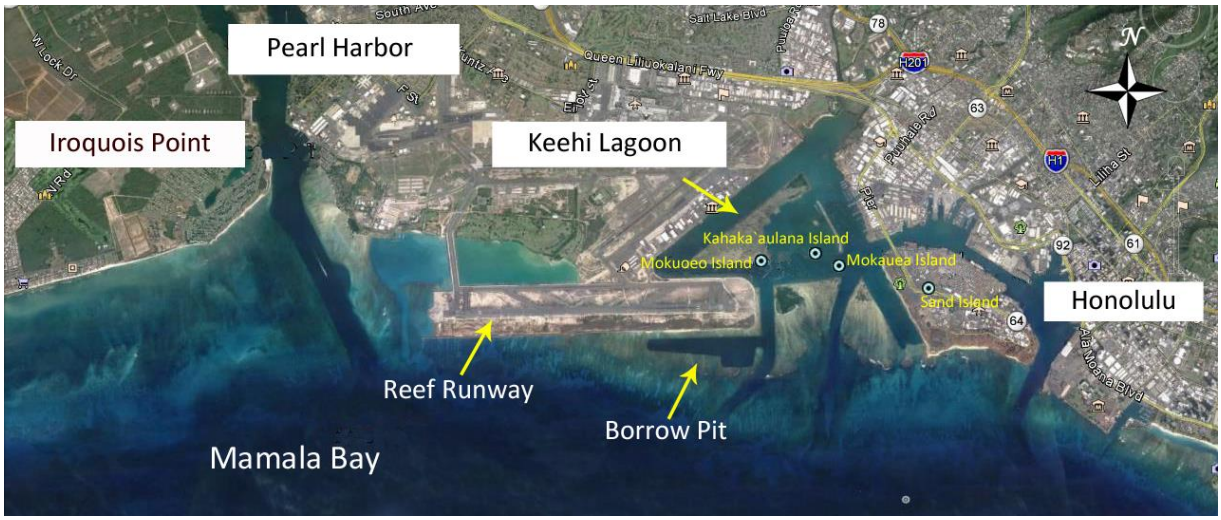

Fig. 1a. Project location and vicinity: Honolulu International Airport, Reef Runway Borrow Pit. Keehi Lagoon, Moanalua, Honolulu, Oahu.

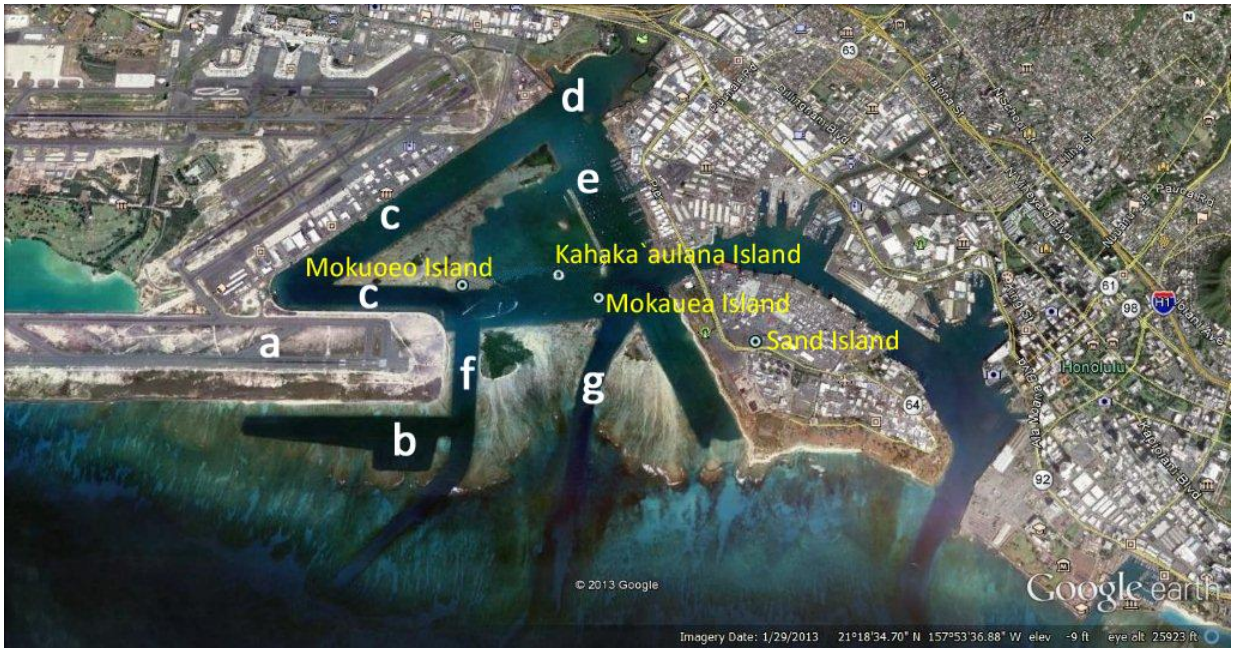

Fig. 1b. Keehi Lagoon area and important locations. Key: a) Reef Runway; b) Borrow Pit; c) Sea Plane Runway; d) canoe racing area; e) water skiing area; f) Water Circulation Channel; and, g) Kalihi Channel.

Fig. 2. Reef Runway Borrow Pit (red arrow), Keehi Lagoon, with water depth in feet of surrounding area.

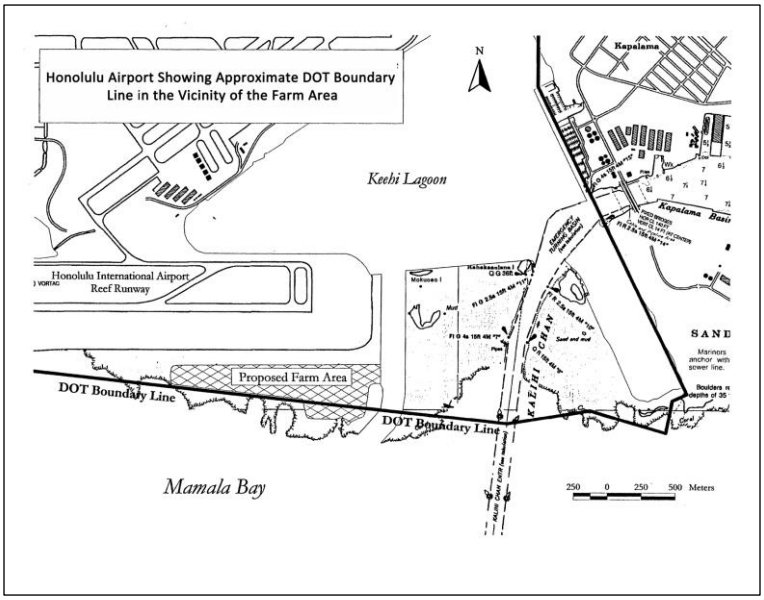

Fig. 3. Approximate boundary line for State Department of Transportation, Airports Division controlled property.

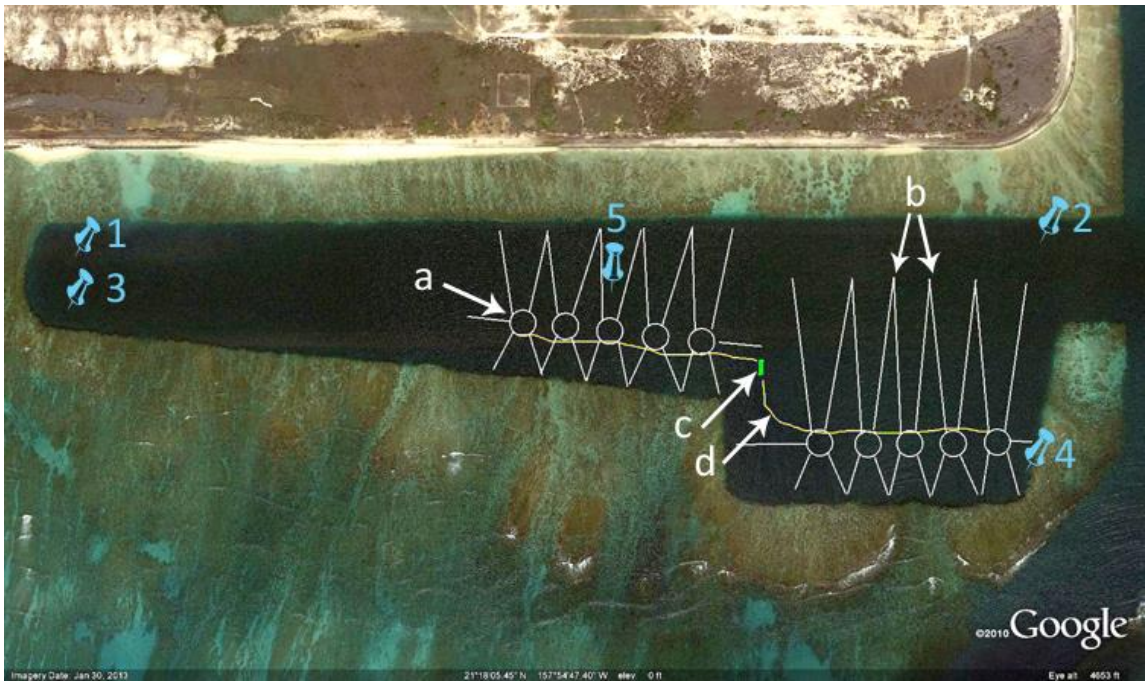

Fig. 4. Graphic of the proposed moi farm within the Reef Runway Borrow Pit, with numbered GPS locations (see text for coordinates). Key: a) cages; b) anchor lines; c) feed barge; and d) feed distribution lines.

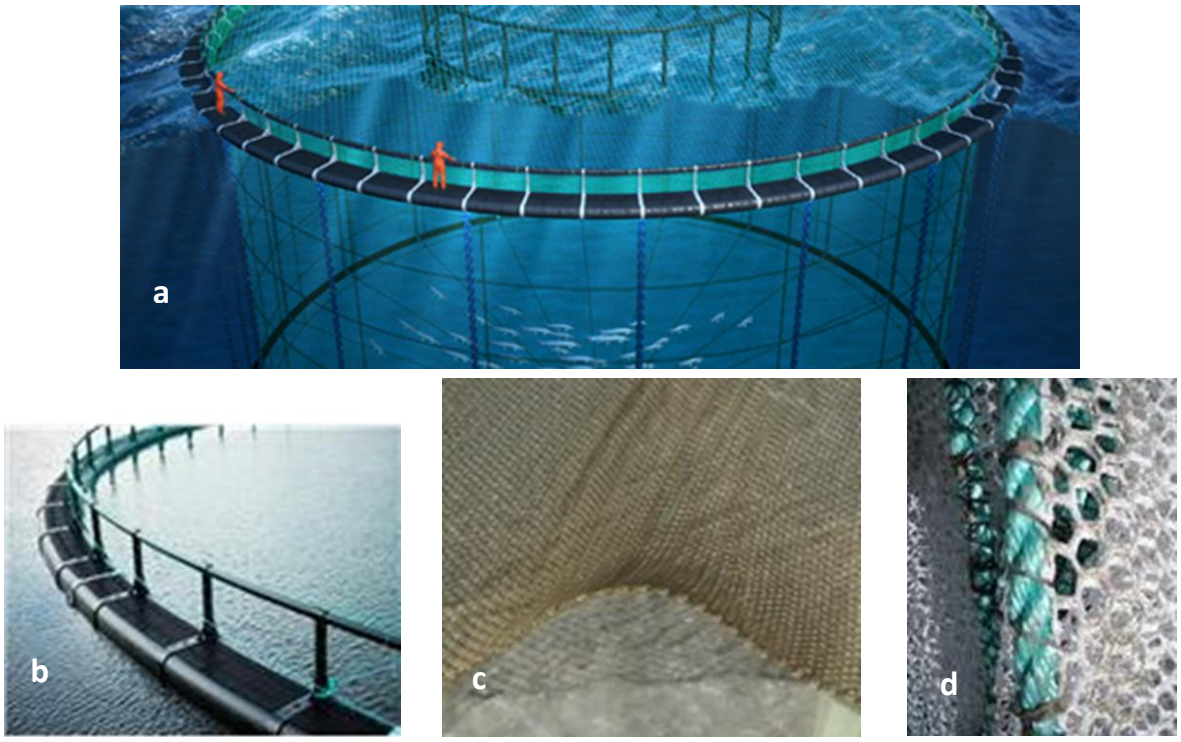

Fig. 5. Representative Aqualine FroyaRing Cage: a) cage; b) work platform; c) copper alloy netting; and d) Dyneema netting.