Aquaculture Farm

and

On-Site Processing Facility

Lot 26 Borlam, Corentyne, Berbice

Mensburgh Aquaculture
Lot 233 Courtland Road
Corentyne, Berbice
mensburgh@gmail.com

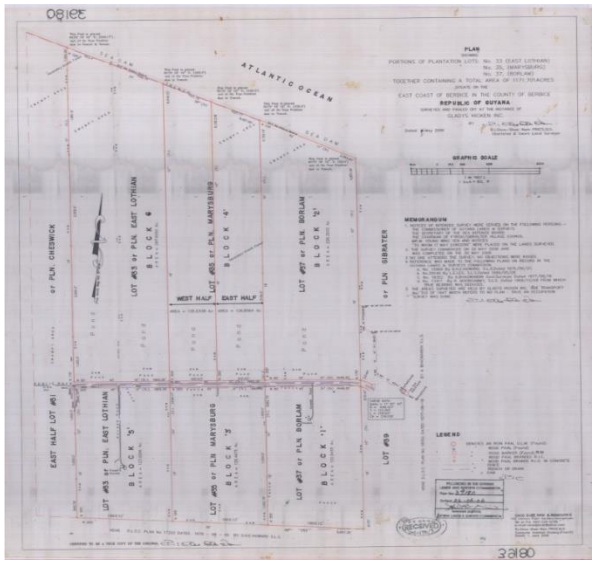
Erwin Abdulla
322-1377

November 2023

A description of the site which should include the area of influence, location, land requirements, layout, identification of receiving water(s), the present land use of the project area and the areas contiguous to it and the location of any existing or proposed intake and discharge structures and the location of any discharge.

The project site is located on the Corentyne Coast, a few miles from New Amsterdam. It comprises a total of over 1,000 acres of land, across the estates of Marysburg, East Lothian and Borlam. This acreage is a significant one, comprising of transported lands that commence immediately north of the Corentyne Highway and extend to the Low Water Mark.

An invaluable attribute of the project site is the presence of over 5 miles of Atlantic Ocean Frontage. This is critical to the operation of the farm, since direct and unimpeded access to sea water is required for the operation of the farm, not only for simple irrigation purposes, but also for the seedstock and food materials contained therein.



The farm site was once a swampy area, used for free-roaming pasturage of cattle. From 1985 to 1990, as many as 200 persons would be employed on any single day, utilizing manual labour to create dams, inlets, outlets, and ponds out of the swamp. By 1990, the farm commenced full operation, while continuing to expand the infrastructure and producing thousands of tons of fish and shrimp.

Mensburgh Aquaculture Farm operations are located away from residential areas. The planned processing Facility will be located within the boundaries of the existing operations, away from residential areas. This will minimize the negative impacts that may be caused by the generation of noise, dust and unpleasant odours.

We are located 125kms from the nearest shrimp processing plants in Georgetown, this has presented some serious challenges and as such has resulted in the planning of our own on-site processing facility

The farm has been designed to facilitate the brackish water aquaculture of fish and shrimp. The current brackish water aquaculture system cannot be practiced without regular access to sea water.

Sea water serves as the rearing medium of the fish and shrimp cultivated. However, the small fish and shrimp (seedstock) are also supplied via the inflow of sea water, since these brackish water farms are not supplied by hatchery-produced seedstock. In addition, natural food materials for the fish and shrimp are present in the sea water, which makes regular inflows of sea water important from the nutritional perspective as well.

The farm obtains sea water from the Atlantic Ocean at three locations. Sea water flows from the Atlantic Ocean into three earthen channels during the high tide, bringing water up to the earthen sea defense embankment, which serves as the northernmost boundary of the farmed area.

Sea water is then taken into the farm via approved concrete inlet structures, bringing with it small fish and shrimp, as well as food materials.

Fresh water is also an important component in the brackish water farming system. Of the over one hundred (100) small brackish water shrimp farms in existence on the Corentyne Coast, Mensburgh Aquaculture is the only one to have a reliable supply of irrigation standard fresh water.

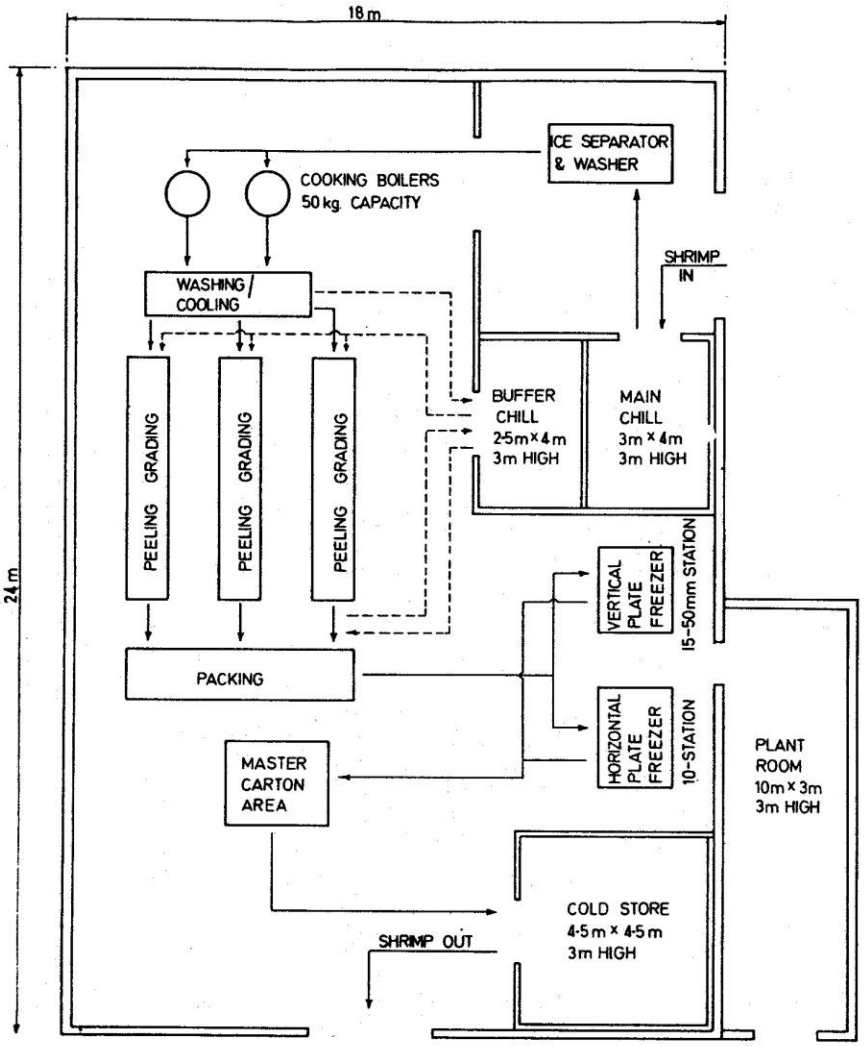
Fresh water is required to reduce excessive salinity in shrimp and fishponds, to maintain the recommended level of salinity for optimum production, and to improve extensive farming practices to a semi-intensive level. The sea water taken into the farm will usually contain the

required level of salinity for optimum production. However, over the course of the crop cycle, fresh water is removed from the ponds via evaporation, leaving the salt behind. As a result, the water remaining in the ponds ends up containing increasing amounts of salt, to the point where the concentration of salt in ponds can inhibit the growth of fish and shrimp. The regular addition of clean fresh water into ponds reduces the excessive salinity, thereby restoring the optimum salinity for fish and shrimp production.

The project design including: Activities associated with all development stages, operation and production processes.

Processing is required to add value to fish and shrimp products, as well as to increase longevity and marketability. Mensburgh Aquaculture will be processing its own fish and shrimp products, due to cost and sanitation considerations, as well as the requirement for the processing by-products for use in feed manufacture. Mensburgh Aquaculture intends to also purchase fish and shrimp products from other brackish water farms for processing and export.

An appropriate building will be constructed to house the processing operation, as per the general design below:



Some solid waste from the processing will be dried, ground and used as organic fertilizer for plants on the farm (primarily coconut trees). Some solid waste will be incorporated into a feed composition, pelletized, and used for food in the ponds.

Water discharged from the farm would contain minimal pollutants, but will include nitrates and phosphates and would be discharged/channeled into areas on the farm containing mangroves and other vegetation where they can be absorbed by plants and filtered naturally before the water is released into the existing drainage canals for discharge into the Atlantic Ocean

Source of utility services such as water supply and treatment, energy/electricity and communication, facilities, etc. Waste management details which should include types of waste and methods of waste disposal/treatment.

Water for the processing facility will utilize existing pipelines from Guyana Water Inc. We would also use storage tanks to use rainwater for non-processing activities.

Electricity required would be sourced using solar panels installed on the roof of the building. Additional needs will utilize existing transformer and services from Guyana Power and Light Inc. We will also have a 75KV generator on stand-by in the event of power loss.

We would utilize existing Internet services

The project size, e.g. capital investment, number of employees projected for each stage of the project.

Activity	Capital Investment	Notes	# Employed
Land Fill	4,000,000	Internal Labour & Equipment	5
Land Compaction	1,000,000	Internal Labour & Equipment	3
Building Design	300,000	Engineer	1
Building Permit		Government	
Building Design Supervision	1,200,000	Engineer + 1 staff	2
Electrical Design	300,000	Engineer	1
Construction of Foundation	16,000,000	Skilled Labour & Material	6
Construction of Building	21,400,000	Skilled Labour & Material	1
Electrical Supervision	3,000,000	Engineer + 1 staff	5
Install Septic Plumbing and Waste Lines	4,000,000	Skilled Labour & Material	10
GWI - Incoming Water and Site Storage	5,000,000	Skilled Labour & Material	6
GPL - Electrical Installation	5,000,000	Skilled Labour & Material	8
Electrical Certification		Government	
Installation of Chillers and Freezers	25,000,000	Skilled Labour & Equipment (Import)	6
Completion of Fixtures (tables, sinks etc)	4,000,000	Internal Labour & Material	4
Totals	**90,200,000**		**58**

A non-technical explanation of the project (a summary of what the project is about in layman language).

Swamp Shrimp is produced using an extensive production system. In this system, water is allowed into ponds during high tides, bringing with it small shrimp, a variety of fish species and natural food. There is no stocking, feeding, fertilizing or predator removal. Instead, the system relies on natural productivity and cultural practices to produce a successful crop. A crop of Swamp Shrimp takes between 6 and 8 weeks to reach market size. Due to this short crop cycle, it is theoretically possible to produce 6 crops per year.

Mensburgh Aquaculture is located approximately 5 KM from the planned airport in Berbice. This major development will provide an efficient means for farm products to access markets in the Caribbean and North America, especially for premium "Fresh-On-Ice" products.

Brackish Water Shrimp from other farms are not exported via the established commercial processing and export chain for local seafood. Rather, most are transported to overseas markets, in a cooked or semi-cooked form, via individual persons.

Mensburgh Aquaculture is the only farm with its own established export and marketing production chain, utilizing existing approved processing and export infrastructure to supply markets with excellent quality in an efficient manner, maintaining ownership of its product throughout the process.





With increased activity in the mining, forestry, and other hinterland activities there is greater need for shrimp and fish products whether fresh, frozen, or dried. Any increased production would find a ready market for a high protein and wholesome product.

An On-site Processing Facility will allow Mensburgh Aquaculture to package and distribute our products, and those of other local farms, to markets in Guyana, the Caribbean and globally. Mensburgh Aquaculture is awaiting the registration and issuance of out Trademark Certificates from the Registrar of Commerce.

Mensburgh Aquaculture currently provides direct employment benefits to several persons, laborers are employed on the farm to carry out everyday activities such as feeding, maintenance, harvesting etc. Women are usually employed to process shrimp, which earns their households extra money. This would most likely improve nutrition and educational opportunities for their children. This results in an increase in their disposable income and an improvement in their standard of living, benefits which will increase with expanded activities. Families with secure incomes, an improved standard of living and educated children will reduce the burden on society at large, since these individuals will require less support from external sources.

The duration of the project.

			Months											
Activity	Time Allocated	Note	1	2	3	4	5	6	7	8	9	10	11	12
Land Fill	2 months	Internal												
Land Compaction	1 month	Internal												
Building Design	2 months	Engineer												
Building Permit		Government												
Electrical Design	1 month	Engineer												
Construction of Foundation	1 month	Skilled Labour												
Construction of Building	4 months	Skilled Labour												
Painting and Window Installaltion	1 month	Internal												
Install Septic Plumbing and Waste Lines	1 month	Skilled Labour												
GWI - Incoming Water and Site Storage	2 months	Skilled Labour												
GPL - Electrical Installation	2 months	Skilled Labour												
Electrical Certification		Government												
Installation of Chillers and Freezers	3 months	Skilled Labour												
Install Internal Fixtures (tables, sinks etc)	1 month	Internal												

Potential effects on the environment which may result from the existence of the project i.e. land, soil, water, air, the use of natural resources, etc. A brief description of each potential effect.

Mensburgh Aquaculture's current farm operations are located away from residential areas; planned expanded operations will also be located away from residential areas. This will minimize negative impacts that may be caused by the generation of noise, dust and unpleasant odours.

As part of its normal operational practices, Mensburgh Aquaculture takes in water for use in the rearing process, then discharges this water after it has been used. The proposed expanded activities of processing and feed production will also result in some pollution.

The processing of fish and shrimp will result in some noise and unpleasant odours, as well as wastewater. In addition, the processing of shrimp and fish will result in waste products such as heads, tails, and shells of shrimp; small crab legs; scales, intestines, bones and fins from fish.

Raw materials used in the operation would include fresh water, table salt and locally sourced lime juices.

It should be noted, 'dumping' of any untreated or unsafe waste product or wastewater back into the Atlantic Ocean would serve as a dis-benefit to our existing operations. We are dependent on the tide bringing in the fingerlings/baby shrimps into the farm ecosystem.

Proposed plans to mitigate environmental impacts

The waste material resulting from the processing of fish and shrimp will contain significant amounts of protein and minerals. Some solid waste from the processing will be dried, ground and used as organic fertilizer for plants on the farm (primarily coconut trees). Some solid waste will be incorporated into a feed composition, pelletized, and used for food in the ponds.

Water discharged from the farm would contain minimal pollutants, but will include nitrates and phosphates and would be discharged/channeled into areas on the farm containing mangroves and other vegetation where they can be absorbed by plants and filtered naturally before the water is released into the existing drainage canals for discharge into the Atlantic Ocean.

The many different species that occur on the farm contribute to the productive systems, either directly or indirectly. The complex interactions between the biodiversity and the non-living components of the farm, such as the soil, water, and air, result in a unique ecology that is essential for the productive aspects of the farm and the quality of the products.

Mensburgh Aquaculture has a policy of coexistence with the many species and complex interactions that form the foundation of the productive aspects of the farm. This means minimal disruption, minimal intervention, and the designation of a nature reserve area to maintain the unique biodiversity that occurs in the brackish water system.

Mensburgh Aquaculture has designated 140 acres, or approximately 10% of the farm's area, for ecological services. These services will in some way mitigate and offset the potential impacts resulting from the farm's operations.

Water Flow and Effluent Management

General Water Flow (Ponds):

We utilize the tidal flow to bring water from the Atlantic Ocean and the baby shrimps. Tides bring in water, the ripples and waves aerate the water.
Water is directed via three (3) channels located north of the sea dam.


Channel - Borlam


Channel - Marysburgh


Channel - East Lothian

Incoming channels take the water through three (3) existing concrete kokers located on the sea dam

1. Koker 1: Borlam – on the sea dam within the property at the eastern boundary of Borlam estate

2. Koker 2 – located on the sea dam west of the Borlam/Marysburg boundary midway to the middle access dam in the Marysburg Estate

3. Koker 3 – located on the sea dam at the middle access dam in the East Lothian estate

Internal trenches carry the water from the kokers to each pond intake area






Plastic tubing diverts the water from the trenches into the nine (9) ponds as required
The salt water is held within the ponds while the shrimp mature to optimal market size, this timeline is dependent on rainfall and is 6-8 weeks, optimal shrimp size if 50-60 count (per pound).
During this time, we monitor the salinity of the water adding fresh water as required, this is also dependent on rainfall
We also visually inspect the pond water for clarity clear/cloudy/opaque turbidity,
We harvest using traditional seins 'hauling' the shrimp.
We transport and sell to the local market,
A portion of the harvested shrimp is transported to be cleaned and packaged for export

Pond Management

The ponds are drained and left to dry, which allows the white cranes to scavenge and clean ponds, they also eat the fish which are predators for the shrimp. The excrement from the crane is high in nutrients and enriches the soil

We use the sun to bake the drained ponds to naturally eliminate the bacteria.

Water leaving the ponds enter the internal trenches where it is re-circulated through the mangroves and trees, which purifies and oxygenates.

The exiting pond water is circulated through the 'reservoir' area before entering the trench parallel to the public road where additional vegetation absorbs the nutrients and purifies the waters

Purified water is passed through 6" tubes into the community trench






Mangroves exist in various areas naturally:

1. the foreshore (sea dam to shoreline before the low water mark, covers approximately 300 acres of land
2. “swampy areas’ on the survey are where the mangroves patches, approximately 150 acres
3. ‘secondary growth forest’ (reef) which is an east-west belt across all estates, approximately 150 acres

Mangroves help in the cooling of water (temperature)

Mangroves on the east-west reef belt serves as a step in the purification of the water from the ponds via constant filtration

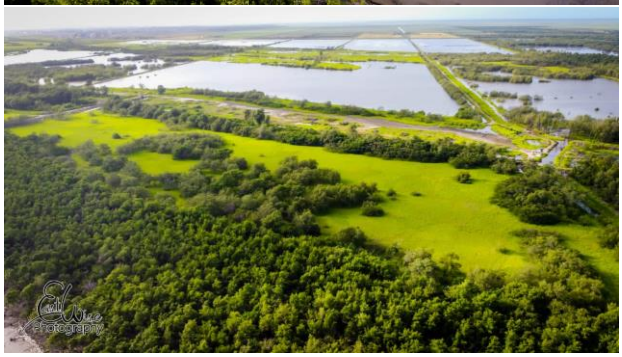
During times of low rainfall mangroves absorb over 80% of salt in the soil to reduce the salinity of the ponds and provide optimal habitat conditions for the shrimp

Optimal pond salinity is 20-30PPM

Ocean water is approximately 30ppm, which varies based on costal location, proximity to estuary, distance from community trench outflows and rainfall.

Aside from water purification and nutrient absorption, mangroves, and tamarind trees in and around the ponds provide organic nutrients via rotten leaves and shade for cooling the waters where the shrimp live. This decaying foliage is what gives the shrimp the “black’ colour.






Crabgrass (Digitaria)

- loves salt and exists throughout the property
- Crabgrass prevents soil erosion due to its extensive root system.
- The extensive root system of crabgrass can help aerate compacted soil by breaking up the soil and allowing air to penetrate deeper, it also improves the overall soil health and structure.

Shrimp Grass (Vallisneria)

- Grows naturally in and around the ponds, especially during the rainy season
- Give shrimp place to hide from predators while they grow
- When it dies, it decays and adds organic matter for the shrimp to feed.

Introduction of the On-Site Processing Facility

The building will be designed to minimize the environmental impacts
The harvested shrimp that is identified for export will be cleaned and processed on-site.
The cleaning and packaging process will utilize fresh water for washing and rinsing and the optimal sized shrimp would be easier to handle thus eliminating the need to use table salt.
The heads and tails will be dehydrated naturally and used as food for the growing shrimp in the ponds.
Water from the washing and rinsing process will be channelled through a 3-chamber gravity purification system before being channelled into the existing the 'reservoir' area, joining the water from the ponds before entering the trench parallel to the public road where additional vegetation absorbs the nutrients and purifies the waters.

Processing – Products - Species

Swamp Shrimp

Swamp Shrimp is the collective name given to a group comprising four species of Penaeid Shrimp, which enter the ponds via tidal flow. Swamp Shrimp is the main product of the current farm and will continue to be a significant part of the production.

The names of the four species are:

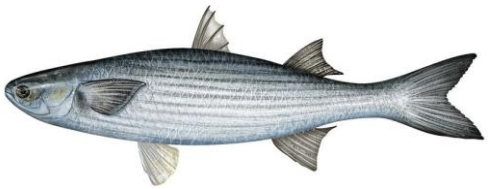
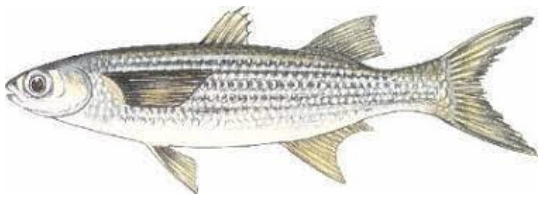
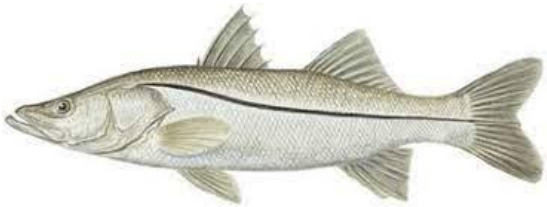
Common Name	Scientific Name
Southern Brown Shrimp	*Farfantepenaeus subtilis*
White Shrimp	*Litopenaeus schmitti*
Southern Pink Shrimp	*Farfantepenaeus notialis*
Northern Pink Shrimp	*Farfantepenaeus duorarum*

However, usually only two species survive in the brackish water ponds; these are:

Southern Brown Shrimp (*Farfantepenaeus subtilis*) This species is smaller and darker in colour and when cooked, attains a red colour. It is also tastier, and this attribute, together with the red colour, results in a higher demand in local and diaspora markets.	
Southern White Shrimp (*Litopenaeus schmitti*) This species is lighter in colour, grows to a larger size in the Swamp Shrimp production system and attains a light pink colour when cooked. However, the lighter colour results in a lower demand in local and diaspora markets.	

Fin Fish

As with the various shrimp species, many small fish naturally enter the brackish water ponds. A few of them, such as Mullet and Queryman, occur in significant numbers, are non-predaceous and have a good market price. Others, such as Cuffum and Snook, which also occur in significant numbers, are predaceous and of somewhat lower market value. These are the majority of the many species of fin-fish that are prevalent in the ponds for processing.

Cuffum / Tarpon (Megalops atlanticus) The tarpon is a ray-finned fish that inhabits coastal waters, estuaries, lagoons, and rivers. It is also known as the silver king. It is found in the Atlantic Ocean, typically in tropical and subtropical regions.	
Mullet / Grey Mullet (*Mugil cephalus)* The flathead grey mullet is a mainly diurnal coastal species that often enters estuaries and rivers in coastal tropical and subtropical waters worldwide. The species is euryhaline, meaning that the fish can acclimate to different levels of salinity.	
Queryman / Lebranche mullet (Mugil liza) The Queryman is a species of saltwater fish found in the western Atlantic Ocean and Caribbean Sea and is fished commercially. It is found in marine and brackish environments and even ventures into freshwater sometimes.	
Snook (*Centropomus undecimalis*) The common snook typically spawns in near-shore waters with high salinities, the juveniles then migrate to the brackish waters of the nearby estuarine environments. When these juveniles mature, they return to the higher-salinity waters of the open ocean to join the breeding population.	
Tilapia / Nile Tilapia (Oreochromis niloticus) The Nile tilapias are brownish or grayish overall and were widely introduced around the world including South America. It can be found in most types of freshwater habitats such as rivers, lakes and ponds, It also occurs in brackish water, but is unable to survive long-term in full salt water.	

Crab

The main crab species are the blueback or blue sheriga, the bunderi and the red sheriga. Sheriga crab is a well-known crab in Guyana. It is a water crab and lives mostly in inland lakes, trenches, and rivers. It is a great swimmer using its flattened and fringed legs as paddles. The claws and shell (back) have sharp points at the ends. Its colour varies from green, black, grey, reddish-brown to scarlet.

Sheriga Crab (*Portunus rufiremus*)

Snail

These Golden Apple snails, known locally as 'Krekete', are a common thing to find in the countryside of Guyana. They are named after the fruit because some of them grow as large as an apple. You can find these aquatic snails in common waterways like drains and trenches or hiding between the roots of coconut trees near water and in rice fields. This species lives in freshwater lake, river, pond and swamp habitats and tolerates a wide range of temperatures.

Kerkete / Golden Apple Snail (*Pomacea canaliculate*)

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Environmental Protection Agency - Guyana

ENVIRONMENTAL PROTECTION AGENCY (EPA) - GUYANA

ENVIRONMENTAL AUTHORISATION SCREENING DECISION

Project Name: Menburgh Aquaculture (Mr. Erwin Abdulla)

Type of Project: Aquaculture Farming

Location of Project: Lot 26, Borlam – North of the Public Road

INTRODUCTION

Project Overview and Description

Mensburgh Aquaculture will be processing local and export purposes fish, crabs, and shrimp reared and harvested from its aquaculture ponds. Additionally, the operation will also engage in the purchasing of fish and shrimp products from other brackish water farms within the region.

The farm currently practices brackish water aquaculture that includes fish and shrimp rearing, which requires regular access to seawater. The seed stock (fish and shrimp) is fed from the natural food materials present in the seawater, which makes regular inflows, therefore a constant supply of seawater is important and its efflux and influx are regulated as desired. The farm obtains seawater from the Atlantic Ocean at three locations. Sea water flows from the Atlantic Ocean into three earthen channels during the high tide, bringing water up to the earthen sea defence embankment, which serves as the northernmost boundary of the farmed area.

Moreover, fresh water is also another important component in the brackish water farming system. Fresh water is required to reduce excessive salinity in the shrimp and fishponds, to maintain the recommended level of salinity for optimum production, and to improve farming practices. The seawater taken into the farm will usually contain the required level of salinity for optimum production. However, throughout the crop cycle, fresh water is removed from the ponds via evaporation, leaving the salt behind. As a result, the water remaining in the ponds ends up containing increasing amounts of salt, to the point where the concentration of salt in ponds can inhibit the growth of fish and shrimp. The regular addition of clean fresh water into ponds reduces the excessive salinity, thereby restoring the optimum salinity for fish and shrimp production.

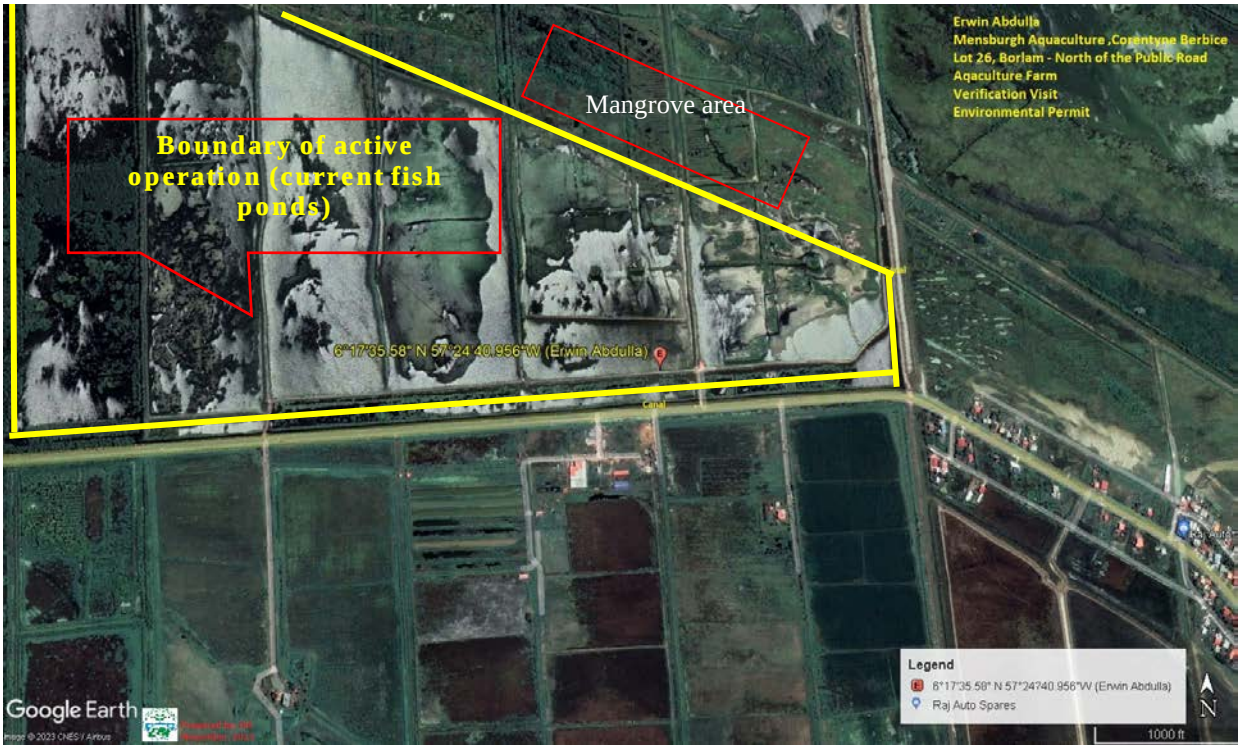

Figure 1 & 2. Maps showing the location of the operation and its surroundings.

ENVIRONMENTAL IMPACTS SCREENING

The EPA's screening concludes that there are no foreseeable significant environmental impacts likely to be generated from this project's activities. In consideration of the location, scale, and type of the operation, the impacts arising during the operational phase are considered to be low, localised, and mitigable. The developer will be required to submit to the Environmental Protection Agency an Environmental Management Plan (EMP) to facilitate a comprehensive study to identify all impacts, associated with the aquaculture farming and the proposed processing facility and to provide relevant mitigation measures to be implemented to arrest impacts impacts arising.

1. The project is suitably located in an agriculture-zoned area towards the northern boundary of the Corentyne Highway. The project is surrounded by vacant lands for agricultural purposes. The closest sensitive receptor is located approximately 350 metres from the activity.

2. The aquaculture ponds exist and will not include any land clearing or destruction of mangroves in proximity.

3. The processing of fish and shrimp will result in some noise and unpleasant odours will be naturally occurring, due to the natural biology of the organisms handled and dried. [i]Trimethylamine (TMA) is the simplest tertiary aliphatic amine. It's responsible for the pungent odour given off by fish and other marine and aquatic animals. Odours from this process will be localised and temporary and easily addressed with the use of disinfectants to control any lingering odours. Additionally, the closest sensitive receptor is located approximately 350 metres from the activity.

4. The usage of diesel-fueled power generators will result in combustion emissions during operation (standby). The exhaust stream is emitted via a stack situated well above any surrounding structures and will disperse rapidly in the open air. The developer will maintain combustion emissions within the parameters of the allowable limits following the World Health Organisation (WHO) standards for air emission into the environment. Emissions are expected to be temporary and limited to the region surrounding activity at the time of operation. The operation is also located approximately 350 metres from the closest sensitive receptor.

5. The impact on water quality from the operational process is expected to be. The project is water-intensive and involves shrimp farming under an extensive farming system. Water discharged from the washing and rinsing process will be channelled through a 3-chamber gravity purification (filtration) system before being channelled into the existing 'reservoir' area, joining the water from the ponds before entering the trench parallel to the public road where additional vegetation absorbs the nutrients and purifies the waters; i.e. containing mangroves and other vegetation where they can be absorbed by plants and filtered naturally before the water is released into the existing drainage canals for discharge into the Atlantic Ocean. The developer will be required to conduct an EAMP, focusing on the effluent discharge and to indicate the efficiency of the natural system in treating pollutants.

6. Diesel oil will be used on-site - not stored. The developer will have a power generator on site for backup power use. As a result, waste oil will be generated, depending on the frequency of the operation and servicing period requirements. Hazardous waste will be in small quantities and will be stored and disposed of in accordance with the Hazardous Waste Management Regulations 2000.

7. Solid waste that includes domestic waste from employee use. From the proposed processing facility - heads, tails, shells of shrimp, small crab legs, scales, intestines, bones, and fins from fish. Solid waste material that will be generated following the processing will be dried, ground, and used as organic fertilizer for plants on the farm (primarily coconut trees). Additionally, solid waste will be incorporated into a feed composition, pelletized, and used for food in the ponds in the future. Solid waste other than the processing facility will be disposed of using an authorized disposal service.

RECOMMENDATION/CONCLUSION

It can be concluded that all environmental impacts were examined and after a thorough investigation it can be concluded that impacts arising from the operation are localised, and manageable. An Environmental Impact Assessment (EIA) will not be a requirement by the EPA. However, the developer will be required to prepare and submit to the Agency an Environmental Assessment and Management Plan (EAMP) to identify the environmental impact associated with the operation of the Aquaculture farm and the processing facility and indicate all mitigation measures that will be taken to arrest same.

It is therefore recommended that this project be published to provide the opportunity to persons who may be affected by the proposed project to appeal against the Agency's decision within thirty (30) days of the said publication.

[i] American Chemical Society - https://www.acs.org/molecule-of-the-week/archive/t/trimethylamine.html#:~:text=Trimethylamine%20(TMA)%20is%20the%20simplest,distillation%20product%20of%20sugarbeet%20residues.