Eastern Fish Markets Limited
P. O. Box 280
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December 10, 2019

Minister of Municipal Affairs and Environment
P. O. Box 8700
St. John's, NL A1B 4J6

Attention: Joanne Sweeney
Director of Environmental Assessment

RE: File No.: 200.20.2907

Dear Ms. Sweeney:

Attached please find the application to register our undertaking with your department.

Sincerely,

Eastern Fish Markets Limited

NAME OF UNDERTAKING:

Land based sea urchin aquaculture

PROPONENT:

(i) Eastern Fish Markets Limited

(ii) 54 Main Street South
Carmanville, NL A0G 1N0

(iii) Chief Executive Officer:

Name: Wayne Wheaton
Official Title: CEO
98 Howell's Ave.
Carmanville, NL A0G 1N0
Telephone No.: 1-709-534-2690

(iv) Principal contact person for purpose of environmental assessment:

Name: Michael Wheaton
Official Title: QMP Supervisor
111 Main St. S.
Carmanville, NL A0G 1N0
Telephone No.: 1-709-534-7174
Email: wayne.efm@bellaliant.com

THE UNDERTAKING:

(i) Name of the undertaking:

Land based sea urchin aquaculture

(ii) Purpose/Rationale/Need for the Undertaking:

Expansion of current sea urchin business which involves more and more direct live sea urchin to end user. Driven by the demand for more and more fresh/live sea urchin around the world.

DESCRIPTION OF THE UNDERTAKING:

(i) Geographical Location:

Our business site is in the municipality of Carmanville, NL. We are located on the south side of the community. The address is 54 Main Street South with 107 Main Street South being the parcel of land directly across the road. While there are 2 addresses for Eastern Fish Markets, it is actually one piece of land that was purchased. The town road runs between the civic addresses but it is one lot. The 54 Main Street South address has no land on the east directly next to it and on the west side, there is a dock which is actually attached to our own dock. All of which we built ourselves.

On the 107 Main Street South side, we have no owner on the west side and a good relationship with 111 Main Street South.

(ii) Physical Features:

We have 5 on land live holding facilities (tanks) ranging in size from 30' by 50' to 40' by 80'. We have 3 of these tanks on the 54 Main Street South property and 2 of these tanks on the 107 Main Street South property. These are in 2 different buildings. Originally, we started with a single building with a tank 16' by 78' with loading dock and pump system for the sea water we use. We expanded the building by extending the loading dock and adding another tank 30' by 50'. Next, we expanded the building again to include another tank 30' by 50'. We still maintain the original pump house (containing the pumps and controls) but have added extra water lines, pumps and controls.

We have 5 pumps for our live tanks. We use Ebara 10hp in the 3 tanks at 54 Main Street South and 2 Goulds 10hp in the 2 tanks at 107 Main Street South. Each tank has its own pump but if a problem arises, we can quickly change how much water is directed to each system. The 3 Ebara's and the 2 Gould's act as independent systems and are interchangeable. If a pump gives out, we can change the water flow without moving all the product in the tanks to allow for timely repairs. We even have a spare Ebara new in the crate in case of breakdowns.

Water is suction from ocean then flows through piping to sand filters. Once water is filtered, it will travel through heat exchanger. Then it travels through chillers (if necessary) to reach required temperature, water is then pumped into the live holding tank. Water falls through drops to add extra oxygen to the water. Air is pumped into the water to add extra oxygen also. Once tank is full to capacity it will be recirculated and pass through the filters and chillers again.

With never having a major outage, we do not have a backup power supply on site. We do however have plans in place if such a failure occurs. We have agreements in place with the owner of the adjacent dock to use his gen-set and diesel power if they are at dock. They have two 65 footers and another 55 footer that generally use their dock. If the failure occurs when these boats are not at the dock, we have an agreement with Cat rental "Battlefield" in Gander. We would have our backup power here in less then 2

hours. All our wiring for our pumps is easily accessible and installation will be quick and painless.

The 2 tanks on 107 Main Street South are contained in one building and are twin 40' by 80' with a loading dock work area in between them of 16' by 80' (larger than our original tank). All the pumps and controls for these tanks are in the original pump house located on the waterside and pump across the road in two 6" lines that have been placed underground.

We have another building located adjacent to the tank houses on the waterside about 40' apart (4 extensions) that house our processing room, holding area, freezers, packaging storage, chemicals for clean up, handling boxes, tubs, trays, etc. and maintenance area.

We have a dock with 400+' offloading area and a loading ramp for moving raw and finished product in and out of trucks. There is an adjacent dock that is owned by a local fisher that we have permission to use when necessary. We have maintained an excellent working relationship with this enterprise since 2002 and both businesses have seen much positive growth over this time. All of the docking area has been built by our crew with local material and no treated timber has been used. Fish harvesters are encouraged to bring all garbage ashore and we dispose of it at the local landfill.

The 54 Main Street South site has town water with 2 driveway accesses while the 107 Main Street South site has town water and sewer with drive around access to the building.

(iii) Construction:

Construction is completed upon equipment arrival (temperature control and monitoring).

(iv) Operation:

The undertaking will operate like the live holding tanks are designed. We have been operating live on land holding facilities at this location since 1987. We currently have 8 holding tanks in 4 locations in the province. We have designed and operated a total of 12 of our own and helped other companies trouble shoot their systems as well. We will be using our plastic lobster boxes to hold 5 to 7 kg of live green sea urchin to feed for a 10-week cycle where the roe content will move from 2 – 3% to 15 – 25%. We expect to run 1 to 2 cycles this winter season and 1 cycle next season after eel production is completed in the fall of 2020. Our first cycle will be around 2,000 kg. This will take place on the 54 Main Street South location. The next cycle will be around 10,000 kg and will take place in both 54 and 107 Main Street South facilities. The fall cycle of 2020 will depend on the results of the 2 prior cycles but if successful, it would be in the 20,000 kg range using both facilities.

Wild green sea urchin will be harvested by local fishers under direct supervision to ensure low mortalities and to achieve the highest possible quality to begin the ranching process. Once harvested, the sea urchin will be transported to our facility in Carmanville where the

sea urchins will be placed in plastic boxes at an average of 6 kg per box (the exact weight per box will be determined by experiments during the trial run). After holding the sea urchin in the plastic boxes for a few days, we determine what, if any, mortalities we will have and then we start the feeding. We monitor the feed usage by (i) looking in the box to see if the feed is physically gone, (ii) looking to see what the sea urchins are doing in the box, (iii) seeing how much waste is being produced, and (iv) crack sea urchin to determine roe content. All of these factors are affected and influenced by the water temperature, water quality and water volume. Once roe content starts to increase and sea urchins show that they require more food, we will increase the amount of feed to 75 g per 6 kg of sea urchin and proceed to a 2-day feed schedule. When we reach the desired roe content, we stop feeding the sea urchin for a number of days (affects the taste profile). The sea urchins are then ready to be harvested for production at our facility, or to sell to another local processor, or ship to a live market. The live market is only limited to the area that we can reach in a timely manner. We have an upper time limit (shelf life) that will ensure the best possible quality product to our consumers.

As with all processing plants, we have rules to follow that control our waste material and we follow those rules. The species that we mostly process is those that have less wastage and high return yields to reduce the impact on the local area. Our lobster is mainly handled live to give us as near 100% returns. Our eels are either handled live for 100% yields or processed which return at 85+% yields. Our ground fish production is similar where we do limited volume but use 90% of the fish which includes fillets, cheeks, tongues for food and frames for bait for fishers. With our ranching plans, we will continue in this trend to sell live (100% yield) or process where necessary (20+% yield compared to the normal 5 – 7% normal yield). We have local farmers in place to accept any solid waste material that moralities or processing will create**.**

We generally operate our facility (live holding tanks) from April to November. Our capacity depends on product and markets. With this licence, we will operate on a longer time frame but not on a higher level for maximum water usage. Due to the years of experience we have with pumping sea water, we see no change or chance of pollution. Our water system is monitored on a daily basis to insure we are receiving the quality of water that we need to maintain to have a healthy environment for our animals. All water used in the live holding is filtered using sand filtration systems (picture appended). The facilities water intakes and discharge are separated by a distance 800 feet. The intakes are located at a depth of 18 to 25 meters. The discharge is at surface, at the facility. We expect that the water quality will actually be improved due to the fact that we are using colder water from November to March then we are currently using. Due to fish numbers and the low feed conversion ratio associated with feeding sea urchin for gonad enhancement, the volume of waste material that will be created by feeding the sea urchin will be within the existing operational parameters for the lobster or eels we live hold. This is due to the volume difference per box (100 lbs lobster vs 14 lbs urchin). We can store 350,000 lbs of live lobster and we will operate at a maximum 80,000 lbs of sea urchin and for shorter holding times (20 weeks lobster vs 10 weeks urchin).

We will have zero resource conflict because we will be harvesting green sea urchin that others can not process due to the roe content. The sea urchin we will target are of zero use to the current industry and therefore, cause no problem with other fishers or

processors. We will be using part of the resource that are currently of zero commercial value. Sea urchin processors want to see roe yields over 5% looking for 8 – 10%. We will be harvesting the 2 to 3% roe that have been sitting on the bottom for years. It is a win win, for the fisher (more money for product that was normally ignored), the environment (sea urchin removal to increase kelp bed areas for multi species nurseries) and us (more work for our workers, longer employment and more profit).

For cleanup, we use a variety of chemicals depending on what kind of cleaner is required and what brand we have in stock. Currently we have Iopor for foot/hand dips. We have Javo 12 for water treatment and sanitation if necessary. We have Meteor and Dibac as our main chemical cleaners. Cleanup for the live tanks is done only when tanks are empty of live sea urchin because chlorine-based cleaners kill shellfish in very low dosages. Most cleaning will be done with portable water from the town supply. The Town uses Javo 12 and maintains provincial guidelines. Whenever the Town is outside of these guidelines, we then add Javo 12 to our waterlines and ensure the provincial guidelines are maintained.

The main waste material that this undertaking will create is the package material that the feed comes in. This bag is mainly paper. It will go to the local landfill site. The bag weights less than ½ lb and contains 50 lbs of feed. For every 1 million pounds of sea urchins, there will be less than 3,200 lbs of waste. So, for our first cycle of 2,000 kg, there will be less than 15 lbs of waste. For 10,000 kg, there would be 71 lbs of waste.

While waste management is a concern, it is not critical at our facility. We have a variety of sop's and systems in place that will keep this from being a remote possibility.

(a) We are on land and in a building. Weather is never a problem.
(b) We have redundancies in our water system for volume of sea urchin. We have more water then the sea urchin requires.
(c) We check water for temperature, oxygen, ammonia cleanliness and check live urchins every day. We'll also be able to monitor by mobile app.
(d) We can process some or all of the sea urchin at our processing plant.
(e) We can make arrangements with other processors to ensure the sea urchins are not dumped.

While many things can set back a live sea urchin ranching facility, we feel that our live handling and proven systems with experienced personnel will be the deciding factor that help us succeed.

Selling live sea urchins will be done in a manner similar to live lobster. While more care will be needed with sea urchins, the handling, packaging and packaging material will be similar.

An Example:
(1) Cloud box
(2) Soaker pads
(3) Gel packs
(4) Tape

(5) Sea urchin

We have an order for 55 kg live sea urchin for Toronto, Ontario. We take the sea urchins out of our live tank. We let them drain for 1 to 2 hours removing water weight. We then place a soaker pad on the bottom of our cloud box and carefully add a layer of sea urchins to the box. We then add another soaker pad on top of the sea urchins. We then add another layer of sea urchins. We repeat these steps until the desired weight of 11 kg. Once we reach this weight, we add a soaker pad on the top and place between 4 to 6 gel packs on top of the soaker pad.

We do the same for the other 4 boxes. Once we have the 5 boxes packaged, we then tape the box securely to ensure temperature control. We then label the boxes with the required information and send the boxes to the airport for shipment.

Processing starts with the expected volume of sea urchin roe we can sell. Once we have this number, we remove the required live sea urchins from the tank and carefully carry them to the production line. Once in the processing room, the sea urchins are placed on the tables. The sea urchins are all turned over so their mouths are facing up. Once this is done, a special tool called a cracker is used to split the shell of the sea urchin without damaging the roe. The roe is then rinsed and cleaned. Any debris or shell is removed, and the roe is sorted by size, color and grade depending on the buyer's specification. Once the roe is sorted, it is packaged in a number of different size and types of packages from the standard 100 g to 500 g dry production to a variety of 800 g to 5 kg wet production. The wet production keeps the roe in water, and this helps prevent any damage during shipment. Once the sea urchin roe is packaged it is the master. The master will contain from 5 kg to 10 kg depending on styro size and individual size. Once mastered, boxes are labelled, cello wrapped and taken for air shipment to a variety of countries, mainly Japan and other Asian countries.

Once production is complete, the shell and gut material will be collected and placed in plastic totes to be removed by local farmers for fertilizer. When production levels are at the maximum, local farmers in the region will avail of all that is produced.

We will be using our lobster boxes to store our sea urchins similarly to lobsters. The biggest difference being the volume we will store per plastic box. While lobsters are stored at 45.5 kg, we will be storing sea urchins at 6 to 10 kg per box depending on how well they feed per density. The plastic boxes will be stored in our live tanks like normal. Single stack on strings to allow for easy movement and tagging.

Our tanking can handle between 175 boxes and 600 depending on the tanks we are operating out of. On a production of 2,000 kg at a rate of 10 kg per box, we would use 200 plastic boxes and use our 16' x 78' tank at 54 Main Street South. For 10,000 kg at 10 kg per box we would need 1,000 plastic boxes. We would need to use the two 40' x 80' tanks at 107 Main Street South with 400 plastic boxes each and the 16' x 78' tank at 54 Main Street South.

Wild sea urchin will be harvested similar to how they are being harvested today for normal production. Divers retrieve sea urchin from the bottom of the ocean. The

changes that will be necessary will be less rough handling, less exposure to weather, wind and temperature, use of circulating sea water. These things are on the handling side.

On the actual harvest, we will be getting divers to harvest what is called "barren" sea urchin. This is to say that these sea urchins will have a low GI "Gonad Index" (1 – 3 %) compared to (7 – 10 %) for normal harvest. We will be taking sea urchin that no other processor wants or can make a profit with.

The feed we are using is mostly made up of trimming from food grade seaweed "ends" out of Japan with minerals and other components to help with color and taste of roe.

The biology of sea urchin in general give us a high roe content in the late winter and early spring. Cold water (1- 3 degrees Celsius) is where feeding roe production is maximized. Sea urchin in the wild will generally live in rough water where circulation and water quality is high.

With our feed, we have been able to (a) force a spawn in October if conditions are perfect for the sea urchin (we don't want this); (b) create a taste profile very consistent to the wild sea urchin and; (c) where color will not determine the taste of your roe (in nature, different colors give different taste)

In general, lower temperatures, higher water volumes will produce better water quality and a better, faster growing sea urchin with excellent tasting roe and high yield roe.

Water quality will be monitored by checking oxygen, ammonia, temperature, salinity and amount of debris. This will be done both manually and via remote access from an app to be downloaded to our phones. These are indicators of water quality and more importantly will give us a warning or heads up to problems to expect with our sea urchins. For example, if the temperature spikes, we expect oxygen to drop and salinity to drop and ammonia to increase because this will put more stress on the sea urchins. With the controls in place, we will be able to fix the problem immediately and save the sea urchins.

We filter the intake water to remove physical contamination. In doing this, the number of microbes is greatly reduced, and water quality is greatly affected. Sea urchin can naturally deal with some "poor water". ie. Storm conditions.

We do not see UV treatment as being necessary due to the large volume of water and filtering out of the solid particles.

(v) Occupations:

After the first trial is completed, we expect to increase the number of employees to keep abreast of additional work. Older, experienced employees will enjoy several weeks work in addition to what they are presently accustomed to. When the ranching is in full production, we will need dedicated staff to ensure that the sea urchins are being properly maintained to insure maximum health and roe yield. Other persons will be required to meet the additional work. Training will be mandatory for those we expect to hire to participate in the new venture. The husbandry of the sea urchin will be key to our

success. While we have a work force second to none on the handling of live fish and shellfish, we will need employees that are more technical and specialized in the aquaculture side of the new operation.

With our current management team and feed producers support and data, we will expand the scientific base for our sea urchin ranching. We foresee working with the local colleges and university to create a program that puts sea urchin ranching and the technical aspect of the feeding and husbandry at the forefront of the business.

We have been in contact with personnel at the Logy Bay facility (MUN professor and sea urchin expert) and are coordinating an on site lab that will allow us to conduct testing and experiments that improve the overall health of our sea urchin and to improve all aspects of our live holding methods and practices. We hope to partner with the outreach program of MUN and create a location that will benefit both research for the university and practical knowledge and commercial expertise that benefits all parties. The end goal being that the workforce of Eastern Fish Markets Limited demand and get better wages and work conditions created from being an industry leader in a sustainable fishery.

How all this falls into place is in no small part linked to how soon we can start the trials and best determine the correct course moving forward. With the facility that we have designed and the expertise of our feed manufacture, we believe that we are well on our way to creating and maintaining a business model that if profitable, environmentally sound and socially minded going forward into an era where the consumer expects more from their food products and the companies that are producing them.

We have a workforce of 22 people plus part time and casual workers. During our first two trials (2,000 kg & 10,000 kg), we will not likely need any new employees. We will be training our management and staff to effectively husbandry of sea urchin. We will be getting training from our feed supplier and on the biological side. The time for the 2,000 kg will be limited to knowledge and skill growth. We are expecting 120 hours of actual work for the 2,000 kg start to finish. We are expecting 650 hours for the 10,000 kg trial. These hours are for the husbandry and live shipment of the sea urchin. Once we cross the line of 10,000 kg to our expected maximum production, we will need more workers with a somewhat different skill set. We will need a marketing person or agent, an employee with lab experience or report writing experience and our product crew will begin processing some of our ranched urchins. We will have a major increase in hours once production starts.

If results are as favourable as expected, we would require both full and part time employees to continue. Job classifications would include but not limited to 9618, 9463, 2222, 1432, 1411, 0823 and 0414.

(vi) Project Related Documents:

Eastern Fish Markets Limited has been in the seafood industry for more than 30 years. Most of this time, we have specialized in the live aspect of this industry. We have been operating on land holding facilities since 1987. To say we have learned a thing or two

about a thing or two would be an understatement. We have grown over the years and plan on continuing to keep growing. Sea urchin ranching will be a component of our expansion. We have never leaped before looking and the ranching of live sea urchin shall be no different. We know that our facility will succeed at holding and growing roe in the green sea urchin. The green sea urchin and the lobster are intermingled in the wild. To handle live lobster and maintain the best possible quality will be our key steppingstone to ensure that the ranching of green sea urchin will succeed. While note everything will match from the husbandry of lobster to sea urchin, the fundamental ideology and understanding of what makes for excellent water and excellent live shellfish handling procedure gives the best chance for success. It will include new state of the art technology that will filter, monitor and house some of the best sea water that live shellfish can live in.

APPROVAL OF THE UNDERTAKING:

Permits and licences that are included but not limited to this undertaking:

(i) CFIA registration of processing plant (Existing)
(ii) FLR processing licence for sea urchin (Existing)
(iii) MAE water use licence (Component of the Aquaculture application referral)
(iv) Municipal permit for land and building development
(v) FLR aquaculture licence (application submitted and in referral)
(vi) EA review (component of the aquaculture application referral)

SCHEDULE:
With construction completed and approved, operations are pending complete review and approval of the aquaculture licence.

FUNDING:

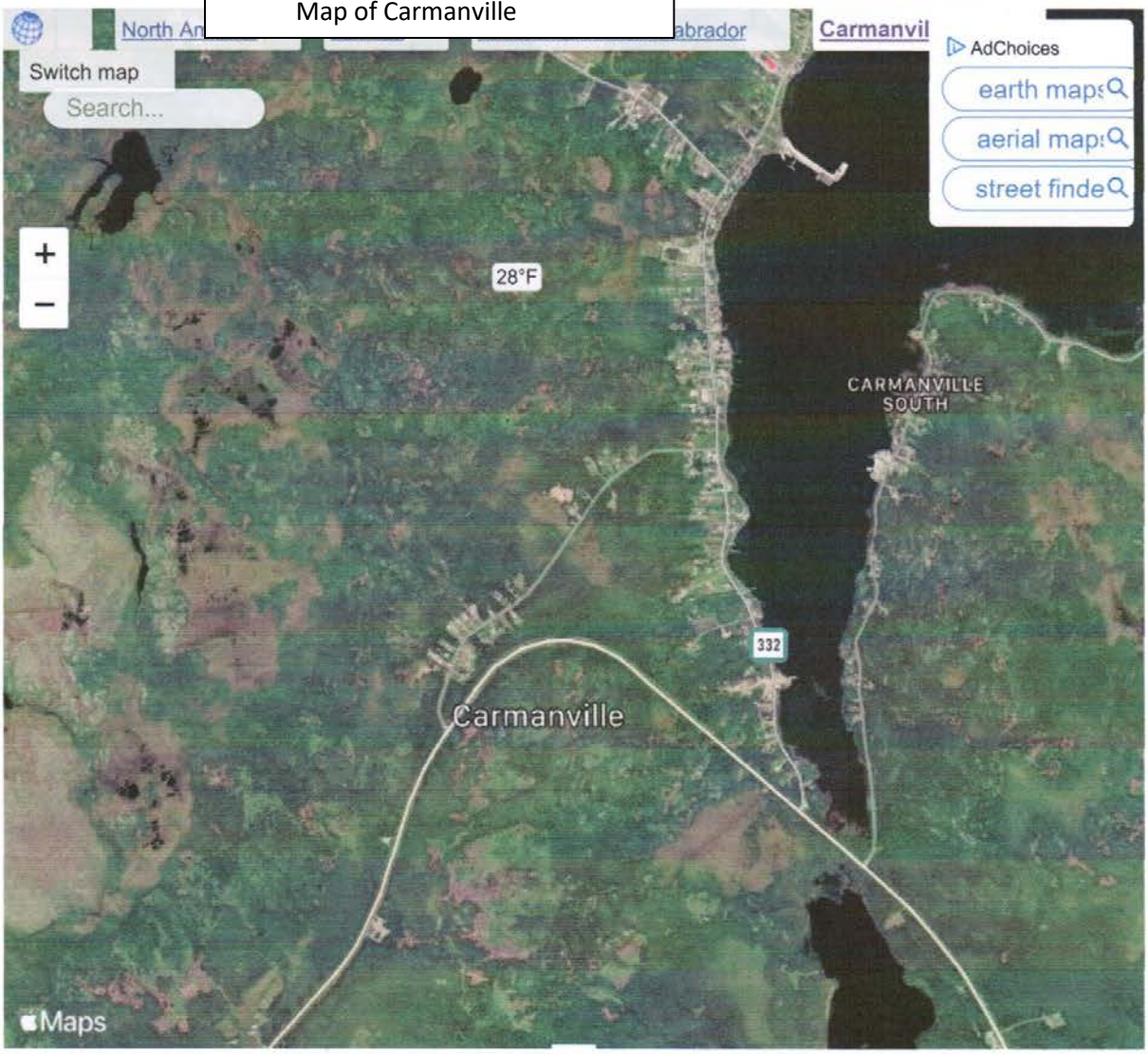
The funding for this undertaking is already put in place. While loans were necessary, they have been forthcoming without the ranching licence for sea urchin.

10 Dec. 2019
Date

Signature of Chief Executive Officer

Carmanville map https://satellites.pro/Carmanville_map#49.391592,-54.266024,14

Map of Carmanville

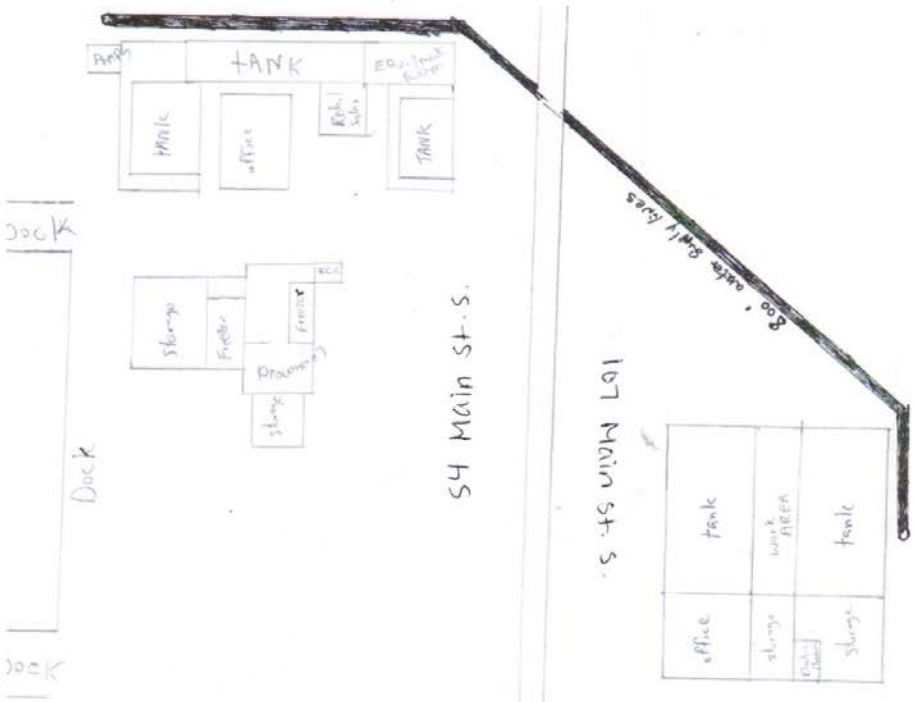


Carmanville
Eastern Fish Markets Limited

Imagery ©2020 CNES / Airbus, Maxar Technologies, Map data ©2020 50 m

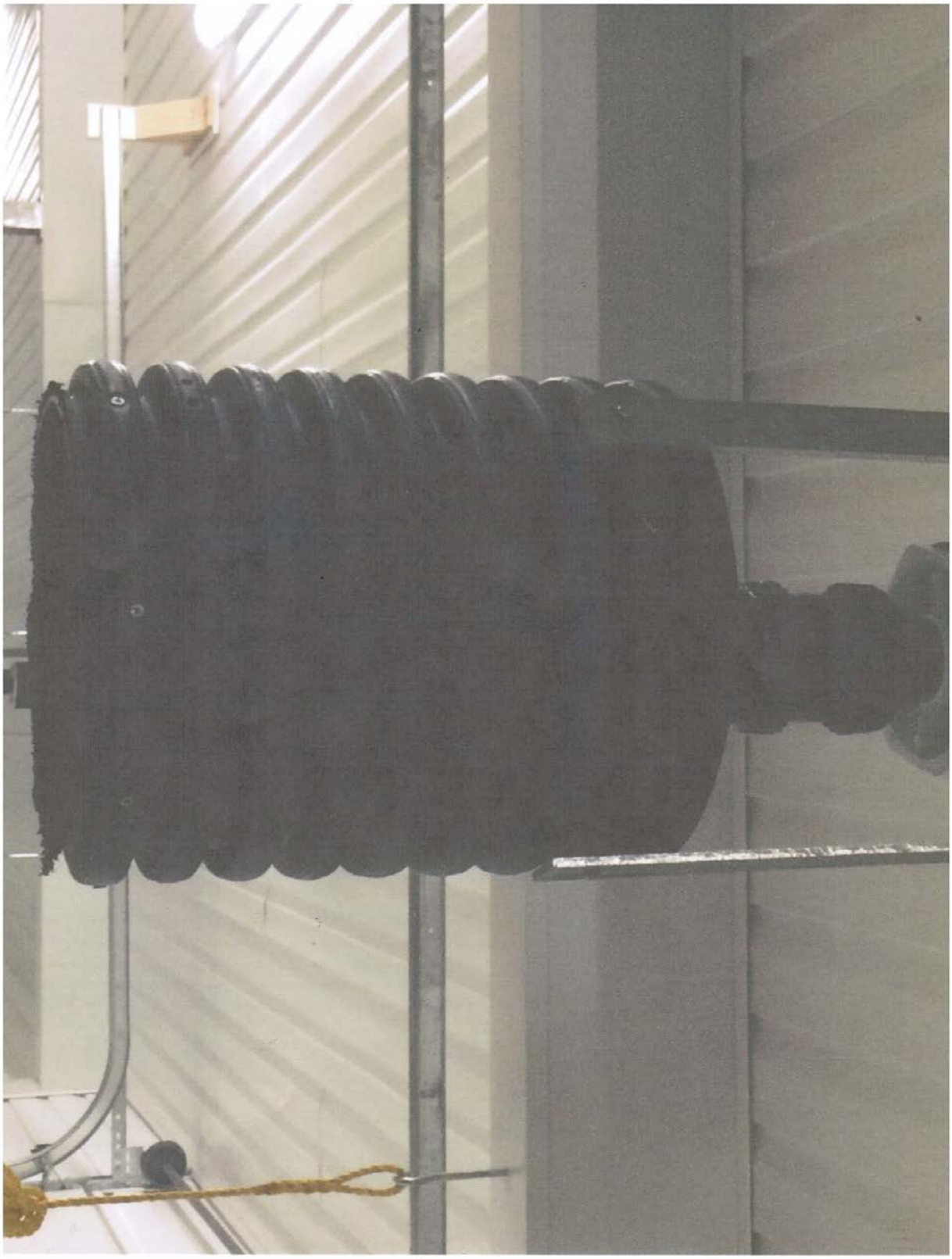
2020-01-09 10:31 a.m.

Sketch of Eastern Fish Markets Limited Site



SAND FILTERS

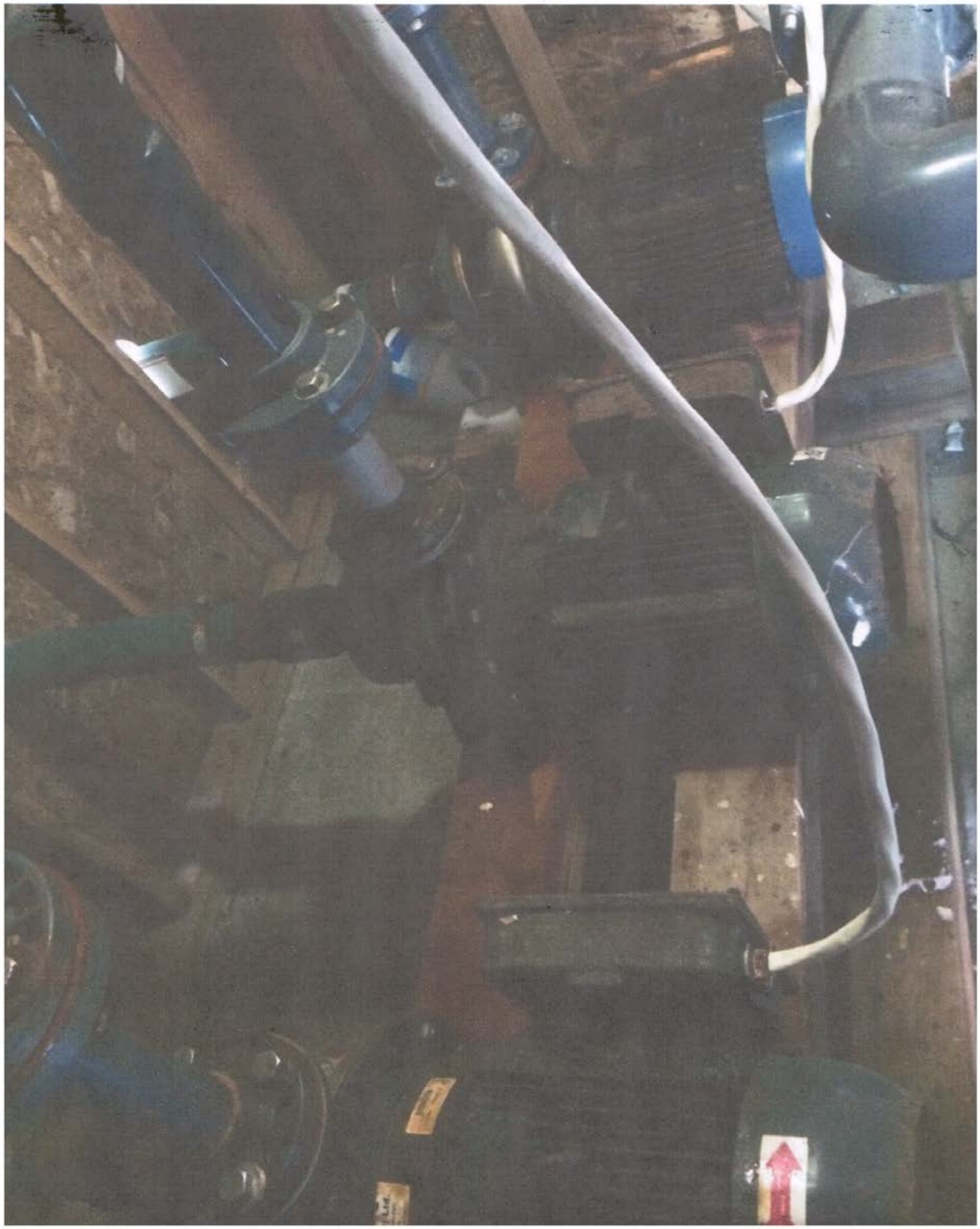
PIPING FOR OXYGEN



DROPS TO AIRATE WATER

AIRATOR RECIRCULATION PUMP

HEAT EXCHANGER



3 PUMPS FOR 54 MAIN STREET SOUTH

PUMPS AND DRIVERS FOR 107 MAIN STREET SOUTH