Version	Date	Description	Author(s)	Revised by
V1.0	09/01/2025	Draft	Stevie Jarron	Walter Speirs

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01 Introduction

Muckairn Mussels Limited (Muckairn) is a Private limited Company (SC142391), registered office - Achnacloich, Connel, Oban, Argyll, PA37 1PR. Incorporated on 2 February 1993. Argyll Aquaculture, who were authors of the previous license have been asked to act as Agent for Muckairn and write this Re-Application.

Muckairn hold 5 planning consents (Annex 1) and 5 marine licenses for combined Algal and Shellfish aquaculture and is part of a larger IMTA farm group. This document is for the reapplication of farm license 06569/18/0 Site 4 (Sgeir nan Ron), specifically. The 5 license consents held by Muckairn Mussels all lie very close to each other. Their applications are required to be done individually, which obviously will produce a lot of repetition, both in the application content and the regulator's work in considering them. The site Operator has overlooked renewal to the suite of 5 licenses, to expire (May 2024) due to a bout of illness. They have thankfully recovered and wish to Re-apply for consent to farm again.

The boundaries of the existing MD IMTA license - 06569/18/0 Site 4 (Sgeir nan Ron), are laid out as:

56° 27.194' N	5° 17.060' W
56° 27.169' N	5° 16.734' W
56° 27.110' N	5° 16.758' W
56° 27.135' N	5° 17.079' W

Northern Lighthouse Board were consulted at various re-licensing stages over the 30 plus years the 5 sites have operated and recommended that Special Marks are placed at the outer northwestern and northeastern extents of farm structures. Muckairn will ensure this is followed as equipment is deployed and recovered during operation phases. These are yellow-coloured floating buoys each marked by a top piece with a yellow St Andrews Cross. A solar powered light unit on each flash yellow at night. These allow local and visitor marine users to keep a safe distance from surface and submerged structures within the consented area. The light pattern is a conventional Yellow Flash every 5 seconds (Y Fl 5s).

The MD license - 06569/18/0 Site 4 (Sgeir nan Ron), has the site consented for 3 x 200m longlines, all of which can be used for shellfish and algae cultivation.

Town and Country Planning (General Permitted Development) (Scotland) Order 1992 (as amended) which apply to marine and freshwater finfish and shellfish developments (updated April 2021) states in Class 21F – Change of use (change of species):
Subsection 65. The Town and Country Planning (General Permitted Development) (Scotland) Amendment Order 2018 introduced change of use (production species) for shellfish farmers. An operator may change the use of their farm from;

- mussels or pacific or native oyster cultivation to scallops;
- scallops or pacific or native oyster cultivation to mussels;
- pacific oyster, mussel or scallop cultivation to native oyster.

This change allows a multitrophic licensed site (such as Muckairn) to be a truly IMTA farm.

This document is more specifically aimed at Nature Scot's needs and has been heavily influenced by direct guidance from them during other seaweed consenting processes.

02 Farming species choice

Muckairn intend to cultivate several native species of seaweeds at the Muckairn Mussels Limited, Loch Etive IMTA site. At this time, the three main seaweed cultivation species being cultivated in Scotland are Atlantic wakame (*alaria esculenta*), Sugar Kelp (*saccharina latissima*) and Oar Weed (*laminaria digitata*). Atlantic wakame does not favour the more sheltered and brackish water location of Loch Etive as they are more suited to sub-littoral rocks exposed to strong wave action. The other two kelps could be grown as required, as the site is suitable for their cultivation. But it is upon the native small red seaweeds, Dulse (*palmaria palmata*) and Pepper Dulse (*osmundea pinnatifida*), and Sea Lettuce (*ulva lactuca*) a small native green seaweed that Muckairn hopes to trial seaweed cultivation. These are far more highly prized and have a greater marketability.

The farm site is relatively more sheltered than other kelp farms in the area and offers easier access for plant and structure management to tend a multi-harvest coppicing at regular intervals throughout the plants' growing seasons. are to the area. Muckairn are including these species in their application in anticipation of the perfecting of the technology to viably farm them is now at hand. Initially, Muckairn envisage small vessels (their own 12m vessel "Molly Malone" and probably a 6m tender) being used for seeding, maintenance, and harvesting which work best in short windows of weather opportunity.

The volumes of seeding plants required to be collected are very small, a standard bucket of fertile seaweed can nurture 20km worth of seeded farm growing line which can produce over 150 tonnes of mature seaweeds.

All the seaweed species to be farmed are native and grow abundantly locally but inhabit the very lowest of the shoreline only exposed on low spring tides. This does not lend them to large scale shore harvesting by hand. So, cultivation is seen as a necessary method to grow these

seaweeds at scale. There are no chemical additions or treatments used for the seaweed growing process. There are no feeds introduced to the water. The ropes used for growing are removed at harvest time. This makes a very light impact form of sea farming on the environment, compared to some other aquaculture. Spatial squeeze is the main impact.

The site is also currently consented for blue lipped mussel (*mytilus edulis*) and pacific oysters (crassostrea gigas) farming and, although this is being considered in the mix, it is not advisable to culture mussels too close to farmed seaweed as heavy mussel spat (seed) can deteriorate the quality and growth potential of the seaweeds. It is most likely that a program of native oyster (*ostrea edulis*) cultivation may be looked at as part of restoration projects that are taking place in the local area.

03 Existing Muckairn Mussels IMTA Farm Group

The **Muckairn Mussels IMTA Farm Group** (Muckairn) sits on the southern shores of Loch Etive (Fig 1). Loch Etive is a tidal sea loch, 30km long from its western end at the sea falls "the Falls of Lora" to the far eastern end where the loch become the River Etive in Glen Etive. The rise and fall of tides in Loch Etive past the Falls of Lora create a bottleneck which creates multiple basins of differing salinity as the Loch progresses east. The Muckairn area can experience brackish conditions, especially during high rainfall periods, remain within salinity tolerance levels of species such as sugar kelp and dulse to thrive. Both shores are rocky and/or cobble strewn and have narrow access road adjacent with farmland behind. Substantial hills rise above both shores with rough pastureland giving way to forestry plantation.

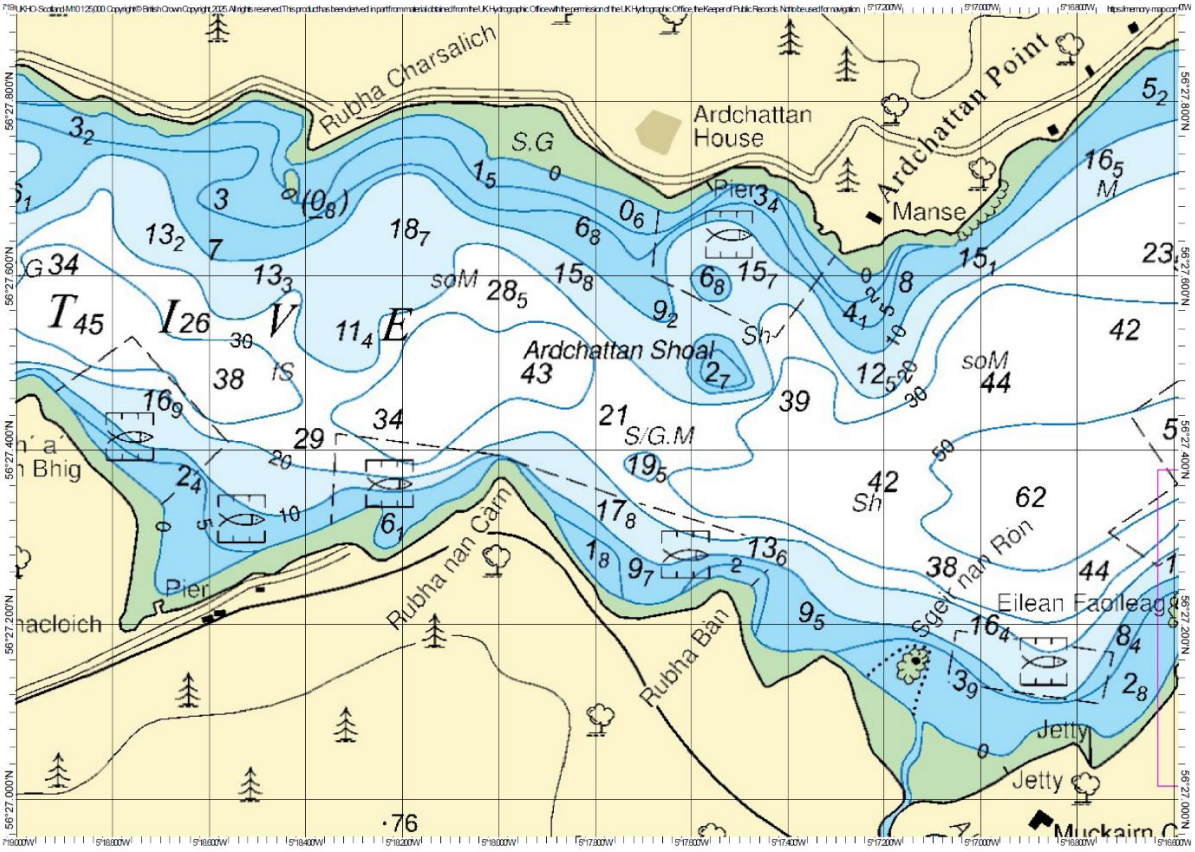

Fig 1 – Muckairn Farm Group sites marked on the south shore of Loch Etive marine chart.

04 Site Designations

Integral to the original consenting process in 2018 was the scrutiny of Site Designations by statutory consultees Nature Scot (the SNH) and the Scottish Environment Protection Agency (SEPA) during the Marine Scotland Licence Application process. This was completed without concern from any of the above Regulators, but Muckairn have undertaken full Due Diligence for their operations.

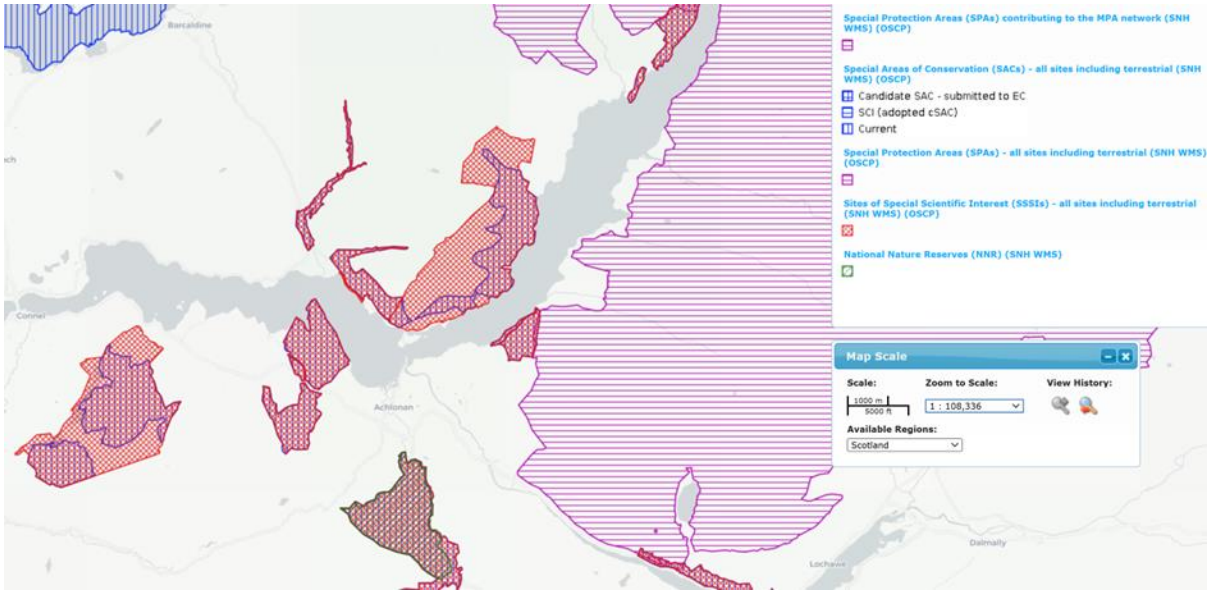

Fig 2 – no marine designations. Local designations are for native forest protection.

04.01 Designations (Fig 2)

The existing consented area of the IMTA farm site, sits near but not withing the Loch Sunart to the Sound of Jura – Marine Protected Area (MPA) https://sitelink.nature.scot/site/10418 which takes much of the sea area inside the Inner Hebrides. This MPA is set up for the protection of 'Flapper skate' (*dipturus intermedius*), which are heavily affected by mobile fishing activity, both as a bycatch of commercial fisheries and destruction of their egg laying sites.

The existing consented area of the IMTA farm site sits outside of, but near to the Inner Hebrides and the Minches Special Area of Conservation (SAC) https://sitelink.nature.scot/site/10508 which encompasses the greater proportion of the whole coast. This SAC is set up for the protection of 'Harbour porpoise' (*phocoena phocoena*), which frequent the west coast of Scotland.

There is no Habitat classification by EUNIS 2019 for the existing consented area of the IMTA farm, but it is likely to be Shallow Circalittoral mud in Low energy infralittoral seabed. Dives and anchor remanets at the site back this up (Fig 3).

Fig 3 - EUNIS classification for site, probably deep to shallow Circalittoral mud

The existing IMTA farm site is clear of Rocky Reefs, which are Priority Marine Features – anchors and subsurface structures will be set on soft sediment, clear of any rocky reefs. Anchor systems have short lines, retaining a footprint within the existing consented IMTA farm offering low seabed impact.

04.02 Underwater Archaeology

The location of the IMTA farm site is not located on / near a Scheduled Monument - including protected wrecks (HES WMS) (OSCP) according to NMPI data.

04.03 SEPA Management Controls

The sea area around the Muckairn IMTA farm falls under Marine Directorate - Disease Management Area 15b which covers all of the Sound of Mull, Loch Sunart, Loch Linnhe and Loch Etive. The scheme in place for disease/lice control and for nutrification control.

04.04 Other Marine users

There are several finfish farms in Loch Etive, the nearest just 1km away to the east from Site 4. These are now managed by MOWI fish farm company.

Occasionally, a small local creel vessel sets pots in Loch Etive, working from Dunstaffnage Bay marina. Most other creel activities are undertaken in the more open waters of Loch Linnhe and the Firth or Lorne. None of the local vessels put creels in near the IMTA farm(s).

Loch Etive is well used by sea kayakers, mostly around the Falls of Lora to the west. Small yachts can be seen inside the loch but due to height restrictions of the road bridge and the complex tides at the sea falls at Falls of Lora, larger vessels are discouraged from entering the loch. Power vessels do often travel up into the Loch. The far eastern end (20km east) is highly prized fjordic landscape and tour boats often trave up and anchor overnight. Large harvest,

maintenance and feed vessels for the nearby fin-fish farms also transit in and out of the loch. Occasional forestry barges come into the loch carrying harvest and planting equipment and taking away logs. The activities at the IMTA farm site will not interfere with passage of vessels as it sits tightly to the south coast of the loch, away from the normal navigation transit routes.

The existing consented area of the IMTA farm sites are marked in accordance with normal navigational practice for aquaculture sites, with 2 yellow Special Marks. A full document "4 - Muckairn IMTA Re-application – All Sites - NRA MEAC Decom v1.0" accompanies this application and lays out the marine safety side of the Re-application proposal.

Also see bellow in - 05 Visual Impact.

05 Visual Impact

The existing consented area of the IMTA farm group is located on the south Loch Etive shore, along a single lane, dead end road. Little of the site can be seen from 1km away on the north Loch Etive shore on the opposite side of the Loch.

There are no national landscape designations which cover the site or surrounding area. There are no nearby core paths or roadways overlooking the IMTA farm site. The closest habitation locations are:

- a few houses to 1km away on the north side of the loch, which have overlooked the farm for the last 30 plus years.
- an unclassified dead end road which runs past the farm sites and the shorebase. There are 3 houses (including the owners) on this road.

From a marine based vantage point, an IMTA farm can be difficult to make out from the land background and the dark colours of the water itself. IMTA farms have a low profile, with the visible surface equipment (already fully deployed) being a series of parallel mussel farm headlines, with 400l black buoys every 10m or low profile wooden rafts. These permanent structures of the farm blend in with the dark shoreline, ensuring minimum visual impact.

The seabed anchoring system sinks well into the soft benthic muds and are kept well away from any rocky reef systems nearer the shore. The sub surface structure of the farm system will be constructed of heavy duty synthetic ropes to minimise the use of steel chains (which wear faster and pollute the area with rust). There are no rocky peaks within the farm footprint. All growing structure (seaweed and shellfish) will be deployed and held under tension subsurface between 1.5m and 5m depths.

The most visible indicator of the farm will be Special Mark buoys placed to clearly mark the outer limits of the site for mariners as indicated by NLB and as a condition of ongoing license conditions of the site. As with other similar aquaculture sites, the specific details of these special marks are given by MD-LOT/NLB as;

a) The site is currently marked with 2 lit yellow buoys fitted with yellow ''X'

b) Each light displays a character of flash one yellow every five seconds (Fl Y 5s) with a nominal range of 2 nautical miles and is installed above the 'X' topmark.

c) The buoys are approximately 1 metre in diameter at the waterline with the focal plane of the light 2 metres above that level, the 'X' topmark is greater than or equal to 50cm length by 7.5cm width.

06 Wildlife Considerations and the environment

Seaweed and shellfish cultivation are relatively benign forms of aquaculture. The seaweed plants need no more than sunlight and both need ocean nutrients to grow. There are no feed additives or waste from the plants or animals.

Seaweeds are plants, so the growing lines are laid horizontally to receive the optimum amount of sunlight. Mussel lines hang vertically. The lines are spaced out to allow water flow for nutrients to reach the plants and shellfish to catch food particles flowing through the site. Seaweed requires relatively more surface area than other forms of aquaculture. This we will hope to balance out by the farming of other shellfish, such as native oysters in lanterns hung under the headline floats. The impacts for low trophic IMTA farming are considered low or 'not significant' given lack of waste these systems produce.

Muckairn are aware of the potential for impact on wildlife, most notably seabirds, seals and (rarely) cetaceans which the wider area has varying designations for. From observations at other seaweed farms and sea farm sites, it has been noted that wildlife can become tolerant of low level human activity especially when kept out of sensitive breeding times and kept at respectful distances.

06.01 Bird and Pinniped Entanglement

The IMTA site will use no nets in the cultivation process for crop protection (e.g. as netting against eider ducks on mussel farms or anti predator netting against seals on fin fish farms). These nets are known to cause entanglement of diving birds and seals.

06.02 Seal Haul outs

Harbour seals (*phoca vitulina*) and grey/Atlantic seals (*halichoerus grypusare*) are both European Protected Species (EPS) and as such have legal protection from harm, disturbance and habitat interference. Both seal species are regularly seen in the area and there is a small colony of harbour seals often seen basking on the Kilmaronag Islands, 2km to the west near the entrance to the loch. This is well out of visual sight from the farm and as such we see no disturbance issues with this haul out are.

As mitigation to avoid seal disturbance, all of Muckairn's activities will be well outwith the 100m distance that "The Scottish Marine Wildlife Watching Code" recommend as safe to avoid disturbance should you encounter a seal or other wildlife at sea. Further details have also been taken from "A Guide to Best Practice for Watching Marine Wildlife". Transit routes to and from the site is a low impact route of 1/2km to the shorebase (shed and slipway) at Muckairn.

Muckairn vessels and crew will be carefully trained on how to interact with wildlife. Many Muckairn vessel staff will be local to the area and are already involved in fishing or marine

wildlife tours and therefore be fully aware of the value of an undisturbed wild environment and the legal and moral obligations of limited interactions with wildlife.

The peak times for kelp seaweed operational activity at the existing farm site is October/November for Growing Line deployment and late March through early May for harvesting (timing will be subject to agreement with statutory consultees to avoid the most sensitive timescales locally).

Peak times of other seaweed and shellfish farming vary but are low impact and follow similar transit routes for vessels as used for kelp seaweed farming.

Muckairn vessels will never intentionally steer toward seals seen in the water. Vessels will slow or where safe to do so, steer to avoid seals seen in the water. Additional advice from NS around slowing and stopping vessels to prevent disturbance has been given and will be adhered to.

06.03 Cetacean Entanglement

Whilst there have been no reported cases of entanglement of cetaceans in kelp or shellfish longline farming (Kraus et al., 2005[1]; NOAA, 2016[2]), Muckairn are designing IMTA farms with wildlife in mind. It is nearly impossible to entangle in a taught rope. Farm design will ensure that lines are held taut at all times and sea states. Most cases of cetacean entanglement is evidenced to be from discarded fishing nets (ghost fishing) or from loose mooring lines or creel ropes.

Muckairn's research on NBN Atlas within a 10km radius of Muckairn, has found that no sightings of the harbour porpoise (*phocoena phocoena*) have been recorded in the enclosed waters of Loch Etive, but they are a common sight in the more open sea to the west. Since this farm was licensed as an IMTA farm in 2018, Marine Scotland, MCGA and NLB have asked for a navigational risk assessment, which includes emergency contact details to various organisations, including BDMLR and the Scottish Entanglement Alliance. This is provided in document "4 – Muckairn IMTA Re-application– NRA MEAC Decom v1.1" which accompanies this Re-application process.

Muckairn staff will visit the existing IMTA farm site as a minimum of once a week (weather allowing) and will contact these numbers if there is any concern over a cetacean in our farm lines. Muckairn staff will be encouraged to attend the BDLMR courses, and we will assist in strandings and entanglements of animals wherever they may happen locally. The existing farm requires no acoustical deterrent devices (ADDs) to ward seals off. As with seals, Muckairn

[1] https://www.researchgate.net/publication/7704221_North_Atlantic_Right_Whales_in_Crisis
[2] https://media.fisheries.noaa.gov/dam-migration/wcr_2016_whale_entanglements_3-26-17_final.pdf

vessels will never intentionally steer toward cetaceans seen in the water. Vessels will slow or where safe to do so, steer to avoid cetaceans seen in the water.

06.04 Foraging and Breeding Bird disturbance

Muckairn's research has found many hundreds of seabird records over many decades entered on NBN Atlas within a 10km radius of Muckairn. Seabirds are often seen roosting on the buoys of similar seaweed and mussel lines on the west coast. They are an important resting provision for foraging birds throughout the year, but particularly in the breeding season.

Cormorants, shags and various gulls can regularly be seen perched on the surface floats of the IMTA farm whilst harvesting was maintenance are underway. These birds would have been in the stages of nesting and feeding of offspring but seem undeterred by the vessel and human operations. Diving birds of various species are often observed swimming down below the surface structures to hunt (cormorants and shags are the most seen birds at aquaculture farms). The IMTA farm attract many small fish (particularly juvenile lumpsuckers), crustaceans and other arthropods, molluscs and various Annelida.

On the west coast of Scotland, it is not uncommon to see various divers (great, black and red necked, little grebes, goosanders and red breasted mergansers) over winter and throughout the summer. Vessel movements around sea farm sites do not dislodge the birds from roosting on the floats or scare them off from foraging. Birds very quickly become tolerant of the human activity at the sites.

The IMTA farming vessel activity predicted by Muckairn at their farm site will be low level (a day or a few days per week on only a few weeks of the year) using small vessels (6m to 13m vessels), that are similar or the same vessels that will work and transit through the sea area throughout the year. We believe that any local birds or other wildlife will be tolerant to our levels of activity.

06.05 Benthic data and seabed disturbance (of PMFs)

There is no Habitat classification by EUNIS 2019 for the existing consented area of the IMTA farm, but it is likely to be Shallow Circalittoral mud in Low energy infralittoral seabed. Dives and anchor remanets at the site back this up.

To secure the IMTA farm structure so it is robust enough to survive winter storms for many years, the farm is anchored to the seabed with steel 250kg and 500kg anchors. These anchors are designed to dig in to the soft benthic muds of the farm site. They quickly bury deep into the sediment and form a secure anchor to carry the load of the subsurface structure and floating surface structure.

Muckairn are confident that since the deployment phase of anchors has already been completed (with obvious impacts to the direct spots on which the anchors are set), that our operational activities will have a negligeable impact on the benthic conditions of the site.

This has been discussed with Nature Scot on other seaweed/shellfish farm consultations and it has been considered that, given that there are no chemical or feed additions, no faecal or wate deposits and that outputs, beyond the initial damage dome during the initial construction phase where anchors are laid, there is negligible impact on immoveable PMF species under or near a IMTA aquaculture site. As a benign aquaculture method, IMTA farming provides more habitat enhancements (roosting, feeding etc) than any negatives.

06.06 Eurasian Otter (*lutra lutra*) disturbance
Otters are a European Protected Species (EPS) and as such have legal protection from harm, disturbance and habitat interference. Muckairn's research has found many otter records over the decades entered on NBN Atlas within a 10km radius covering the sea farm site. Also, from discussions with local residents and marine users around the area, it was confirmed that otters are regularly seen on the shorelines, crossing roads and near rivers across the area, and that they had heard other residents discuss seeing otters as well.
We have applied the precautionary principle and the section below discusses potential for disturbance to otter during operation of the IMTA farm. Otters are regularly seen on in most parts of the Oban/Lorn/Etive coast, including within the busy town of Oban itself. They can be remarkably tolerant of people, vehicle and vessel movements.

Nothing in Muckairn's development or operational phases of the IMTA farm will constitute a threat to the life of an otter. Nor will any part of our operation touch land to damage or destroy their holts or holes. Landing of the seaweed uses an established pier at Muckairn.

The discussion on potential sources of disturbance can be split into 3 parts;

06.07 development phase disturbance
Any development work at site eg, weight or structure replacement, maintenance or repair will be of short duration (estimated less than a few days, weather dependent). It will likely require the 13m work vessel to lay any anchors accurately into the seabed and to use winches to pull tension on ropes and lines. No cables will be strung to the coastline. All anchors will be laid in sublittoral positions and all ropes strung from these anchors head directly away from the shore to subsurface structures.

NatureScot guidance suggests that "If otters are known or suspected to be breeding, the exclusion zone should normally be at least 200m radius. However, it could be reduced to 100m depending on the nature of the works, topography and natural screening. For shelters, or holts

where otters are not breeding, the boundary of the exclusion zone should be a minimum of 30m.". These exclusions zones are nominally looking at physical changes to the land near otters. As the IMTA farm will be sited off from the coastline and will not physically touch or alter the holt or hole of any otter, we would hope that the 30m rule would apply as a maximum. And the fact that the farm already has been in place for many decades is taken into account. It could be argued that the most direct disturbance to the otters could be the presence of any surveyor conducting an otter habitat survey on the shoreline itself.

A male otter's territory can be significant, using 20 km of rivers and coastline to hunt and defend up to 3 females against intrusion by other males. The female otters form sub-territories within, in which they produce up to 3 cubs, usually in early summer. The mother will rarely leave them for the first 10 weeks from birth at which point the cubs will begin to become mobile. They will then follow their mother as she hunts and suckles the young. She will use multiple holts and holes to dry off (otters don't like being wet!) and to sleep (which they do for more than half the day). They will nurture the cubs for a year up to 18 months to teach them to fish by catching and releasing live fish for the cubs to re-catch.

It is difficult (without the aid of photo traps) to assess whether otter shelters or holts are being used by a breeding otter or not as females with cubs reduce sprainting to avoid detection. Indeed, it is an offence use photo traps without appropriate licenses.

No works that are undertaken fall within the minimum 30m exclusion zone. The minimum distance from the Mean Low Water Spring (MLWS) and distance to Mean High Water Spring (MHWS) is 30m (sheer shoreline) to avoid encroaching into the shoreline area. The predicted timing of any upgrades to the IMTA farm structure is late summer, which will coincide with any otter cubs becoming fully mobile.

06.08 Operational phase disturbance

All farming operations will take place in daylight. Seaweed deployment periods will be October to November for seaweed line deployment. Seaweed harvesting periods will be from mid-March through into late-May. The mainly nocturnal nature of otters will hopefully allow us to present no disturbance to feeding patterns. Shellfish work will be occasional and mostly confined to the late spring to early autumn time window. Winter weather will discourage small boat work at the site, beyond occasional visits to check the IMTA farm structure (a condition of license consent).

06.09 Ongoing presence and its effects

For the greater part, the IMTA farm will be left unattended by vessels. Outwith the operational phases (including all evenings, nights and weekends during the operational phases) little or no activity will take place over the winter months of September to April. Farm activity to tend lines, set lines or harvest will be modest, one to two days a week for a few weeks at the busiest periods.

A brief diurnal phase of otter feeding during the shortest days of the year will coincide with the winter slow growing period, where the IMTA farm is left mostly unattended save for occasional visits by small boat to check condition of the farm structure (a condition of license consent) and to take samples for quality and growth monitoring. We will ensure we do not visit the site near to dawn or dusk to prevent disturbance to otter feeding times during the hard winter months. This also a good practice for safe use of small vessels in winter.

06.10 Water column and seabed shading

IMTA cultivation Growing Lines are placed out at sea on the farm at various times of the spring to autumn months and the lines over-winter there. Shellfish are laid out in low density dropper lines or small lantern baskets and have a negligible effect on shading.

Seaweed growing lines are laid in autumn and the seaweed grows rapidly February through to April and harvested out by end of May/June. The low angles of the sun in the spring months the estimate of shading of the seabed and water column is less than 1% in Dec, less than 4% in Jan, less than 7% in Feb, less than 10% in Mar, less than 15% by end of April and the seaweed is harvested out by end of May. The chosen site of the IMTA farm is light benthic mud. It is therefore calculated that the IMTA farm will have a negligeable effect from shading on the wider marine environment.

06.11 Nutrients

Low trophic IMTA cultivation does not require the input of feed or conditioning chemicals. All the plants require to grow is sunlight and the shellfish a flow water as they draw in nutrients and minerals essential for their growth. These are then available to us when we consume the crop. Muckairn's IMTA farm site is in a relatively active sea loch which attracts significant tidal currents flowing in and out of Loch Etive. These strong tides replenish the nutrients constantly preventing nutrient depletion in local waters.

07 Muckairn Biosecurity Plan

This section forms the basis of a stand alone policy that will be broadened and become Muckairn's Biosecurity Plan. In addition to this section, please see the proforma Biosecurity Plan (Annex 1 – Biosecurity Plan – Mock Template).

07.01 Invasive non-native species (INNS)

INNS are one of the biggest global threats to biodiversity, undermining the inherent resilience of ecosystems and causing significant economic costs for sectors such as agriculture and fisheries. Along with disease transfer, INNS cost £billions per year globally in harvest and infrastructure damage and the loss of local biodiversity presents an incalculable threat to future generations.

Muckairn have based their Biosecurity Plan around such publications as Nature Scots' Commissioned report - Marine biosecurity Planning. Muckairn will lay out each part of their existing farm operations and then describe the actions they will ensure are undertaken to protect from transfer of INNS or disease.

It is considered that overall, INNS are a Low Risk issue for IMTA aquaculture as the main materials used for cultivation are placed in the water for only short periods (6 months to 18 months) before being removed and replaced or cleaned thoroughly for reuse. No feeding barges or cages are used in seaweed cultivation and no equipment or vessels transfer to other aquaculture sites.

Only native species will ever be grown on Muckairn's IMTA farm and seed stock taken from the local area only. No seed stock of non-native species will be brought in. All equipment used will be thoroughly washed before and after use to prevent the spread of INNS. Cards showing the common INNS species will be supplied to staff and contractors to identify potential INNS growth on the farm structure.

All Muckairn staff and contractors will be trained in INNS recognition via ID cards placed on vessels, shore bases and at the Muckairn's processing Hub and an effective reporting process put in place. In the event of the positive identification of an outbreak, staff will ensure that no product affected leaves the site. Any equipment and ropes affected will be taken ashore and will be treated and Nature Scotland informed immediately. Low Risk

We do not envisage disease issues at our IMTA farm site but our crop and animal husbandry practices around seaweed, mussels and oysters will remain vigilant. All equipment and growing lines deployed will be returned to shore for cleaning or disposal. Low Risk

07.02 *Mytilus trossulus*
Cross speciation of *Mytilus edulus* with *Mytilus trossulus*, effectively ended commercial mussel cultivation in 2012 at Muckairn due to consistently poor meat yield of the resultant hybrid. Trossulus numbers have reduced, and hopefully will reduce further with the new salmon growing methods by Mowi at the nearby fish farm in Loch Etive.

A report by SARF http://www.sarf.org.uk/cms-assets/documents/48901-352547.sarf064.pdf, highlights the extent to which Muckairn Mussels went to, to clear the site, Effectively dropping their entire stock onto the seabed to be predated clean by crabs. Whilst *Mytilus trossulus* occurs naturally across the region, so cannot be considered as a non-native species under the WANE act 2012 definitions, given Muckairn Mussels experience with the economic impact of *Mytilus trossulus*, caution will definitely be taken, in line with developed code of practice guidelines http://www.gov.scot/Resource/0039/00398608.pdf.

There are no specific plans or specific destination in mind to move cultivated specimens to sites away from the consented areas at Muckairn's site(s). Any potential scenario for any future opportunity to move vegetative material from the site for seaweed farming would be after successful cultivation season at the site and come as a request for fertile "fruiting bodies" of mature plants in the autumn.

Standing advice from SEPA (https://www.sepa.org.uk/media/143312/lups-gu13-sepa-standing-advice-for-marine-scotland-on-small-scale-marine-licence-consultations.pdf (page 16).) on this matter is "3. The applicant utilises locally sourced stocks for seeding of the cultivation systems and that mitigation measure to reduce impacts on the collection site are included in any procedures for this operation".

Locally sourced stock has not been specifically quantified, but rule of thumb distances during discussion has been loosely taken as within 100km on the same coast system (biome).

07.03 The Farm Site
The existing site of the IMTA Group at Muckairn is over 3km from the nearest habitation on the coastline, the village of Connel. As such the site is well away from any direct sewage or chemical outputs from direct source pollution.

Muckairn will ensure that all harvest taken from the farm site will be washed ashore in fresh water at their processing Hub. The waste water from their processing is disposed through the areas' traditional Sewage Treatment Works (or septic tank system), which digests any materials in a microbial process, destroying and organic contaminant. Plant waste from the processing will be taken to be composted locally. No waste material from Muckairn's processing activities will find its way back into the sea. Low Risk

07.04 Seaweed Species

Muckairn intend to cultivate several native species of seaweed. At this time, the main seaweed cultivation species at the site will be, Sugar Kelp (*saccharina latissima*) and potentially Oar Weed (*laminaria digitata*)[3]. These large brown seaweeds or "kelps" are found naturally on lower littoral and sub-littoral rocks on the shores of Loch Etive. Other large brown seaweeds, such as Furbellows (*Saccorhiza polyschides*) may also be trialled to test for natural self-seeding of lines and for their chemical and nutrient content.

The Kelps have similar seeding seasons and scatter seeds into the water in late November through to early January. Fruiting bodies develop on varying parts of the seaweeds, near the base of the plants in the case of alaria, or along the fronds in the other species. Fertile seeded stock will be collected from local shore sites and will be cultured onto growing medium at a commercial hatchery.

Dulse (*palmaria palmata*) and Pepper Dulse (*osmundea pinnatifida*) are valuable, small red seaweeds and Sea Lettuce (*ulva lactuca*) a valuable, small green seaweed that are native to the area. At the moment they are mostly hand harvested but the technology to cultivate them has been development by a commercial hatchery partnering Muckairn. We include these species in the application in anticipation of the technology to viably farm them being available imminently.

The volumes of seeding plants required to be collected will be very small, a standard bucket of fertile seaweed could nurture 20km worth of seeded farm growing line which could produce over 150 tonnes of mature seaweeds.

All laboratories that Muckairn will employ in the duty of seaweed seed production will be fully accredited and work to hygiene standards to ensure no cross contaminated of seaweed stock (or diseases) are brought back to Muckairn's site. Low Risk

07.05 Shellfish Species

Muckairn intend to develop cultivation of several native species of shellfish. The site has been used in previous years for the cultivation of blue lipped mussel (mytilus edulis) and pacific oysters (crassostrea gigas), but there is great interest in beginning to culture native oyster (ostrea edulis) which has up until very recently, only been cultured purely for habitat restoration projects but is being is attracting commercial interest in the food market. It is hoped that joining with local native oyster farming schemes, we may be able to utilise the IMTA farm for these. Lantern baskets are a well used and know method for oyster farming and have been used at the site on the existing infrastructure.

[3] It is considered that the brackish nature of Loch Etive waters may be unsuitable for Atlantic wakame (*alaria esculenta*).

Blue lipped mussel farming may clash with seaweed farming as the heavy spat from mussels may cover seaweeds and reduce crop and quality levels.

No equipment or ropes based at the farm site will be moved to another site and no equipment or ropes used on another site will be brought in. Any equipment or ropes brought ashore from the Muckairn farm site will be treated by cleaning with fresh water above the high tide mark. All equipment stored ashore will be kept separate from equipment from any other sites.

Any equipment that has accumulated crustaceans or algae on them that is brought ashore will be washed down with fresh water and along with air exposure cause the demise of sea grown fouling. Low Risk

07.06 Onward Processing

To ensure the IMTA farm produce retains its quality it will be landed locally and loaded onto temperature controlled vehicles for onward delivery to be processed.

Drying is the main processing method used at this time for seaweeds. Water content is be reduced through compressing or spinning equipment before chopping then drying at low temperatures. This creates a stable, storable product that can be rehydrated as a future new ingredient. Currently, seaweed processing is done further afield but there is discussion underway with other seaweed farmers and processors for the creation of an Oban processing hub, to suit pre-agreed buyer specifications.

Shellfish have many local routes for further processing and distribution to a wide and well developed market, with many more shellfish companies across Argyll and Bute.

For all processing routes, Muckairn will ensure that all harvest taken from the farm site will be washed onshore in fresh water at a proposed processing Hub in Oban or at processing facilities of client partners. The waste water from their processing will be disposed through the areas' traditional Sewage Treatment Works (or sceptic tank system), which digests any materials in a microbial process, destroying and organic contaminant. Plant waste from the processing will be taken to be composted locally. No waste material from Muckairn's processing facility will find its way back into the sea. Low Risk

07.07 Lost Lines and Site Waste

The IMTA farm site will be visited on a weekly basis throughout the year to ensure the structure and any growing lines deployed are fixed and tensioned appropriately. Any broken lines will hopefully still be attached at one end and so can be recovered and either reattached or removed. During fallow periods the visits will be a simple passing visit by a local vessel to ensure all floats are present and that all is well with the site. There are no chemicals or cleaner additions to the water column at the site from any of Muckairn's activities.

Any waste generated from the project will be disposed of ashore through local, certified commercial waste disposal. All ropes and equipment will be stored ashore during fallow periods of the farm. And all cleaning of ropes and equipment will be done ashore. There are no Special Waste requirements envisaged.

Muckairn are forming research partnerships with multiple leading universities. One area of research we are leading as an industry partner is biodegradable Growing Lines. We will be beginning our operations with tries and tested techniques and equipment, but also trialling, and in time hopefully fully committing to using ropes for our Growing Lines with an ability to breakdown harmlessly in the environment. We cannot divulge at this time the detail of the research due to its commercial sensitivity but are assured that the resultant ropes will not be based on hydrocarbon derived plastics.

Annex 1 – Biosecurity Plan – Mock Template

MARINE BIOSECURITY PLAN

Site Name or Description of Operation:	IMTA Farm
Site/Operation Location(s):	Muckairn (Site 4), Near shed and pier
Plan period:	Aug 2025 to Aug 2026
Biosecurity Manager:	Walter Speirs

Site features affecting biosecurity:

Salinity	Full - 31 and 32 grams per litre
Submerged structures	2 x Special Marks (2 anchors and risers)
Surface structures	3 off 200m longlines
Non-native species known to be present	None

Vessel types using the site/involved in the operation:

	Vessel type	**Risk factors;** Pathway, speed, biofouling control	**Risk:** High/Medium/Low
1	Landing craft	Local harbours to site, 8 knots, vessel antifouled annually	
2	Harvest Boat	Local harbours to site, 8 knots, vessel antifouled annually	
3	Creel boat	Local harbours to site, 8 knots, vessel antifouled annually	
4			
5			
6			

Site Activities which have a significant risk of introducing or spreading non-native species:

	Activity Description
1	No activities are seen as significant risk of introducing or spreading INNS
2	
3	
4	
5	
6	

Biosecurity Control Measures – Instructions for staff/contractors/site users:

Who	What	Where	When
Charter Vessels	Biosecurity Plan	Given to Charter company	Before contract commences
Farm staff	Biosecurity Plan	Training given to staff by Farm Manager	On induction, annually reviewed
Processing Staff	Biosecurity Plan	Training given to staff by Processing Manager	On induction, annually reviewed

Site surveillance and reporting procedure:

Site Reporting log (aka MEAC log)	All activities relating to the farm site to be logged. This includes (but not limited to) debris entanglement, damaged lines, any wildlife interaction (including sightings of cetaceans), vessel interactions, suspected INNS

Contingency Plan:

Action	Responsibility	Location of Equipment
Suspected INNS found on Structure	Farm Manager	On vessels
Suspected INNS found on Growing Lines	Farm Manager	On vessels
Suspected INNS found amongst Harvest	Processing Manager	In Processing factory

Location of biosecurity logbook:

With Farm Manager

Plan Review Date: 01/08/2026