

Mara Seaweed Ltd - St Andrews Bay Seaweed Farm

Navigational Risk Assessment, VMP & MEAC



Details

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01 Introduction

Mara Seaweed Ltd SC390829 is a Private Limited Company formed in 2012 (formerly Celtic Sea Spice Company Ltd). The company harvests and processes intertidal seaweeds from the coast of Fife. Mara Seaweed Ltd (Mara), propose to deploy a seaweed cultivation farm 6nm from St Andrews in St Andrews Bay. The cultivated seaweed will be grown on lines on permanent sub surface structures anchored to the seabed.

Mara wish to provide all marine users and regulators with the information to ensure safe passage around the farm site. This document provides information on the farm position in relation to other users, lighting arrangements and the structure of the farm itself. Mara will describe their development and operational phases, the timings and the vessels that will be used throughout.

Mara look at the Navigational Risk hazards introduced to the site by their construction and operation of the seaweed farm, and look at any mitigation that can be put in place to reduce these risks.

The last section of this document is the Marine Emergency Action Card (MEAC) that will be given to Northern Lighthouse Board (NLB), Marine and Coastguard Agency (MCGA) and other marine users in the area before the farm is deployed.

Mara will also inform the Hydrographic Office of the positions and types of navigation buoys, as agreed by NLB and MCGA, at the site, prior to commencement of any deployment of equipment.

To ensure that Mara's proposed seaweed farm does not unnecessarily impact on wildlife at the St Andrews Bay site Mara have worked closely with Nature Scot and under their advisement produced 2 accompanying documents "Mara Environmental Responsibilities" and "Mara Vessel Management Plan" that look at specific concerns raised by the protection given to the area, the timing of vulnerable periods (of birds) and Mara work phases (Development and Operational). A similar styled Vessel Management Plan is contained within this document.

Beyond completion of these documents, the recommendation contained within will become Mara's Standard Operation Procedure (SOP) for marine farm Deployment and Operation.



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02 Project details and scope

Mara seek to introduce aquaculture to the east coast of Fife at a site roughly 6nm east of the small port of St Andrews. This offshore site will consist of 4 outer markers, already agreed with Northern Lighthouse Board (NLB) and Royal Yachting Association Scotland (RYAS) as to be 4 x Cardinal Marks. The site proposed is approximately 1,760m x 1,865m.

The growing structures within the licensed site will be longlines secured at each end by concrete or steel anchors that will barely sit proud of the seabed in water depth of around 20m+ OD. The loglines will be 200m in length and have surface floats for buoyancy at each end and smaller floats at 50m intervals in between. Up to 5 seaweed Growing Lines of 200m length (of 10mm to 14mm rope) will be deployed along the length of the longlines. Deployment will generally take place in October and harvesting in April/May, when these Growing Lines will be removed from the site along with the subsequent seaweed harvest.

Mara plan to develop the site in 3 Phases with 20 longlines being deployed in Phase 1, 20 more longlines in Phase 2 and a further 60 longlines in Phase 3. The timing of these Phases will depend on the development of products and market access.



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03 Vessel Traffic Review

A desktop study was undertaken to assess the Navigational Risks to vessels in the area of the proposed Seaweed Farm (A). Using Marine Traffic tracking software, it was possible to provide Density Maps for 2020 and 2021 (Fig 1) as well as a chart showing fishing effort of creel vessels in the same area (Fig 2).

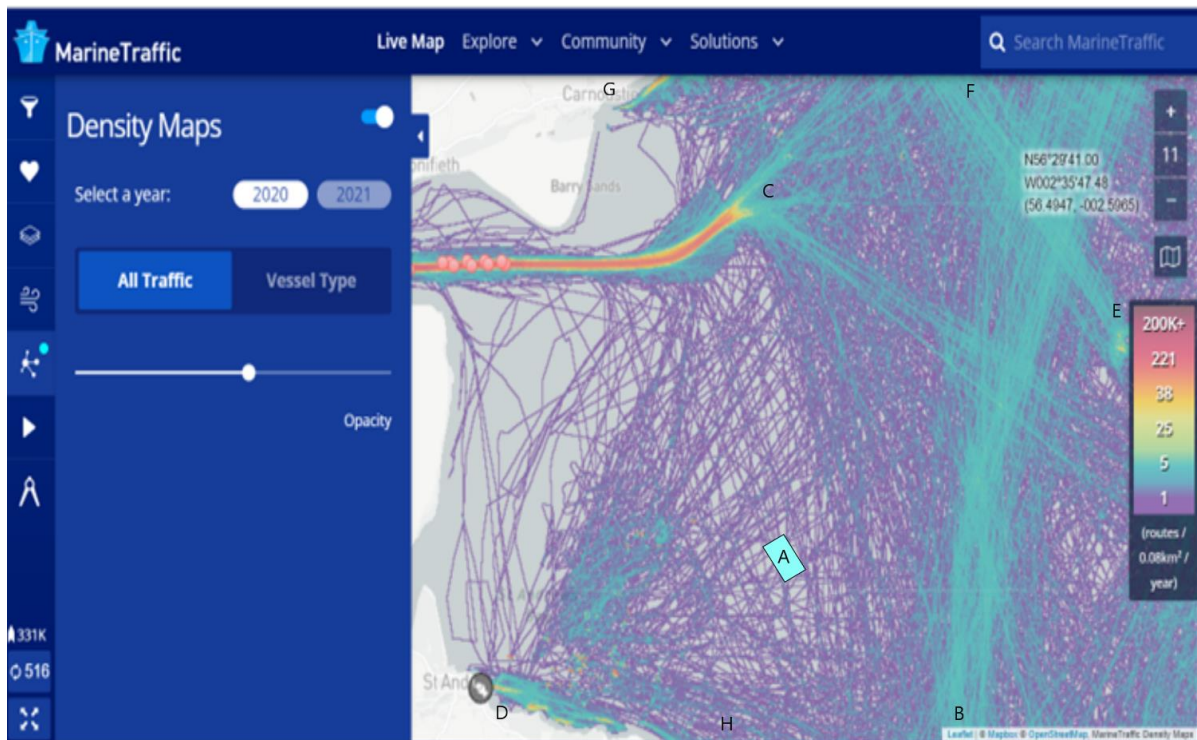


Fig 1 AIS 2020 Density Map

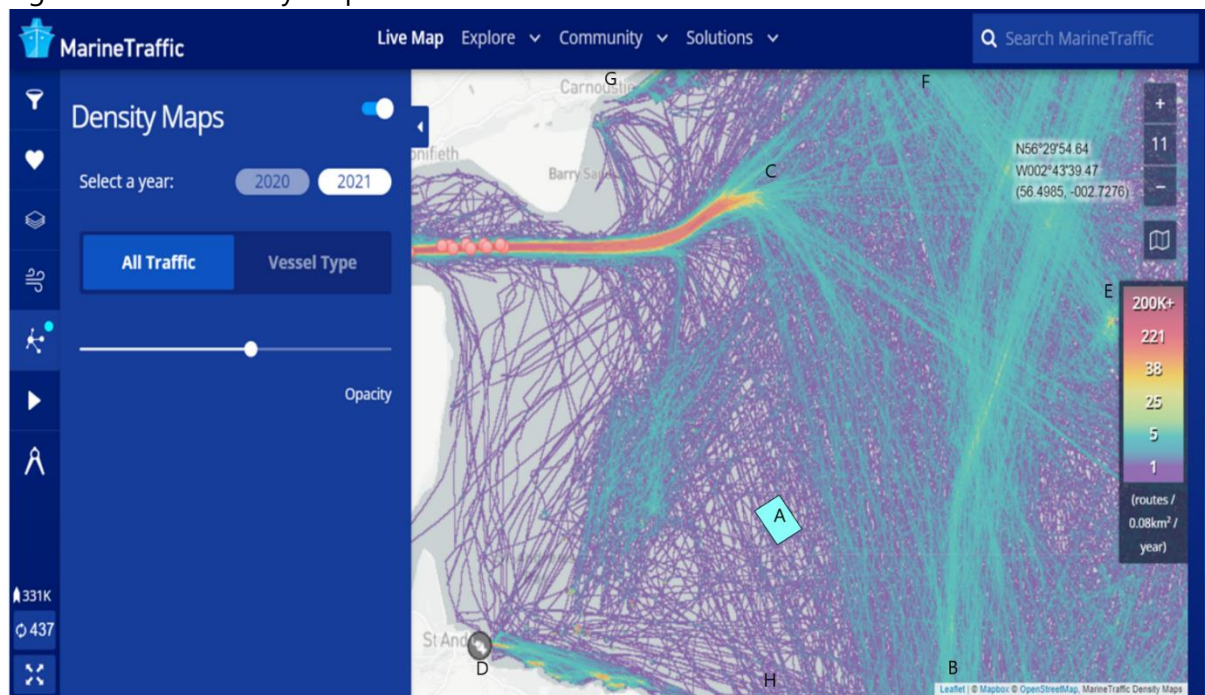


Fig 1 AIS 2021 Density Map

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An analysis of the above AIS density maps shows;

- that a main route from the outer North Carr east Cardinal Mark (B) to the east of Fife Ness serves as the turning point for vessels entering and leaving the Firth of Forth. A line of tracks can be seen from there north to the outer Fairway Buoy (C) that is the turning point for vessels entering and leaving the Firth of Tay marked navigation channel. This traffic is made up of a mix of sizes of commercial vessels and pleasure vessels. It was seen that some of the pleasure vessels cut a track further west as they near the entrance to the Firth of Tay, turning in to the channel early, between two of the port hand marks. There is a clear 500m distance between the most south and east corner of the proposed farm site (once all 3 phases are in place, over 900m when phase 2 is in place and over 1,700m when only Phase 1 is deployed.
- the 6.1nm distance from St Andrews Harbour (D) to the site (A) is a regularly used area for large vessels to shelter at anchor. Patterns from the 2 years shown on the density maps indicate larger vessels anchoring closer to the coast in St Andrews Bay are no closer to the west-most part of the farm site than 1.35nm. Varying weather patterns between 2020 and 2021 could be the reason for the difference in anchoring patterns, but Covid could have also had a large impact. Covid caused a large number of vessels to anchor for long periods as work patterns were disrupted. They may have chosen to use the north end of St Andrews Bay to shelter for longer periods while awaiting crew changes or work rescheduling. What it does indicate, is that anchoring vessels will move north and south of St Andrews Bay to find holding ground, not move further east into deeper water near the proposed farm site.
- the vast proportion of coastal traffic and windfarm traffic are well east, around 3.25nm away in a sea lane roughly equidistant between the proposed farm site and Bell Rock (E).
- regular AIS traffic between Arbroath (F) and Bell Rock (E) indicate fishing vessels from that harbour frequenting the grounds there. A dense fishing pattern can be seen between Arbroath and the coastline down to Carnoustie (G). Regular AIS tracks along the coast from Kingsbarns to Fife Ness (H) shows the intensity of local fishing in that area also. There is no corresponding AIS signal intensity near the proposed seaweed farm site. This may not indicate the full picture as not all fishing vessels are required to display an AIS signal. We therefore look at the fishing density charts below (Fig 2).

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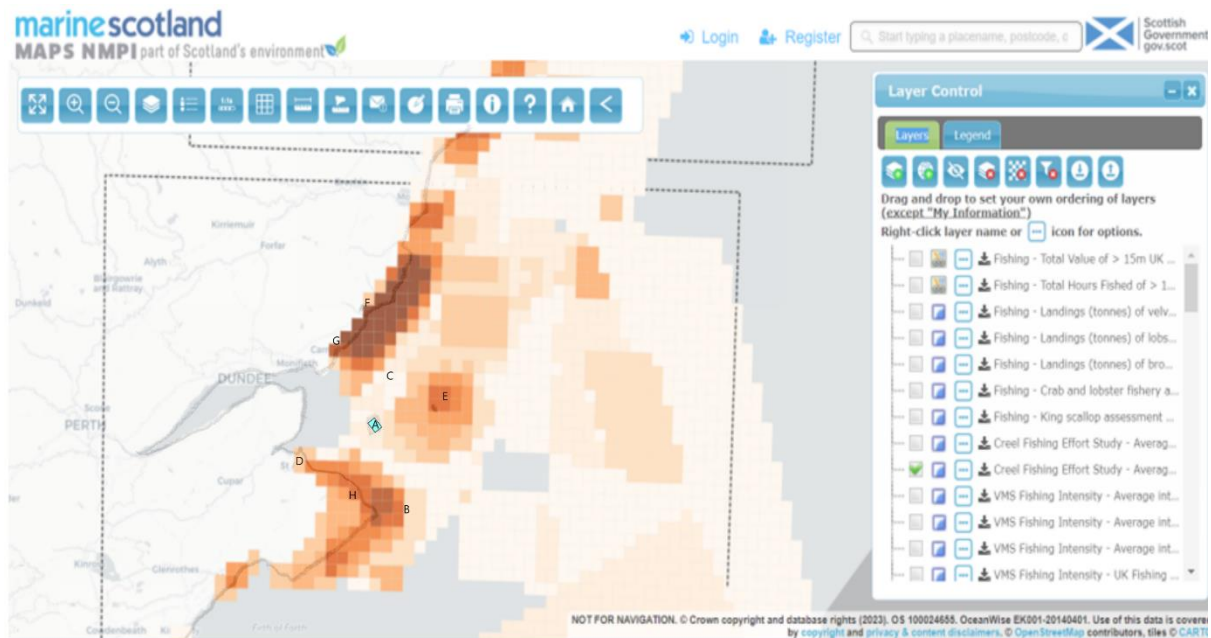


Fig 2 Fishing Density Maps

An analysis of the above fishing density maps shows;

- a similar fishing density pattern, as indicated in the AIS data, can be seen in the area around Bell Rock (E), between Arbroath (F) and the coastline down to Carnoustie (G) and along the coast from Kingsbarns to Fife Ness (H).
- there is no corresponding fishing density indicated at the proposed seaweed farm site. This may indicate that far fewer vessels work the site of the proposed seaweed farm.

Discussion with local fishing vessel owners and fishermen associations initially led Mara to believe the site for the proposed seaweed farm was poor shellfish fishing ground, unsuitable for shellfish and so is an area they avoid.

Once the PAC process had started, 2 fishing vessel owner/skippers came forward to point out that the site chosen by Mara is part of their regular fishing grounds. Mara hope to have meaningful discussions with these individuals to find a mediation of compromise if our site interferes with their fishing patterns.

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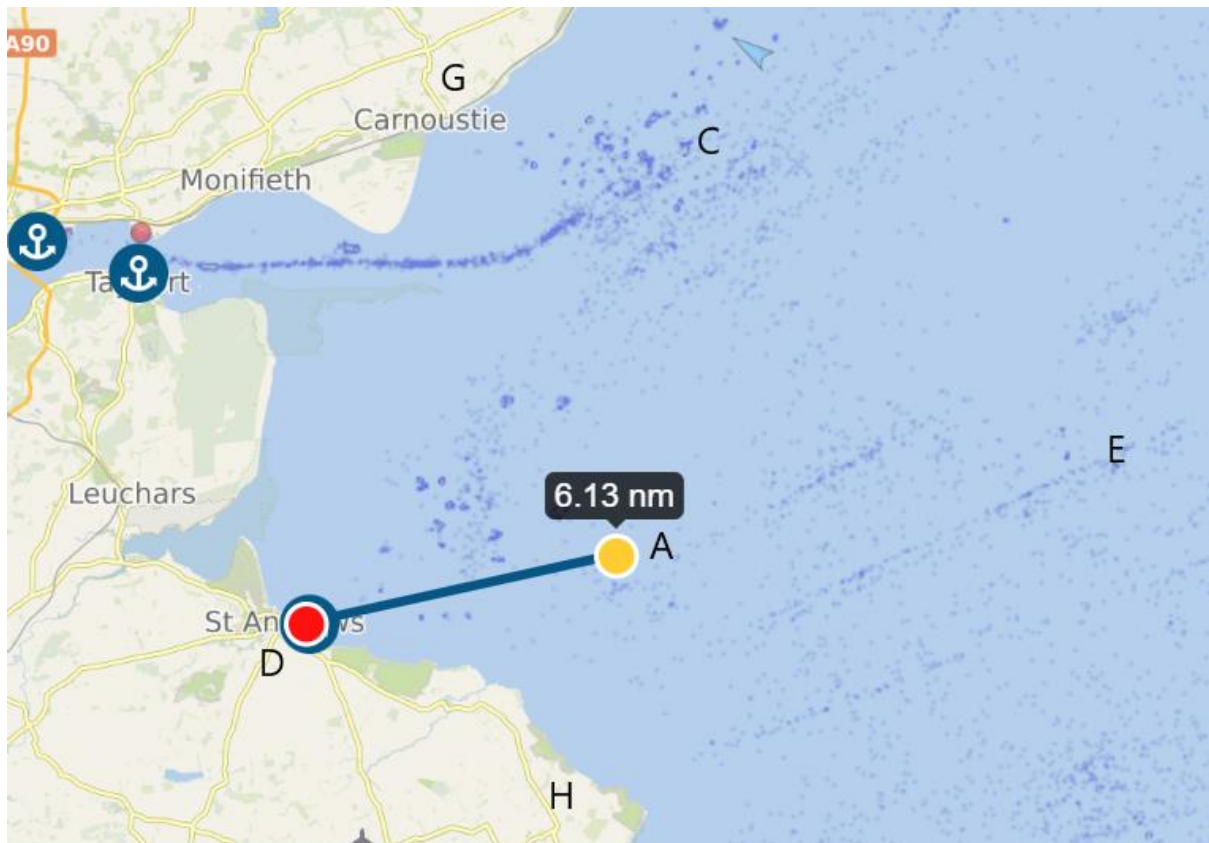


Fig 3 - AIS tracking of vessels swinging on their anchors. Track line distance to proposed farm.

- interrogating further AIS data (Vessel Finder 2022), patterns emerge that show large cargo vessels regularly using St Andrews Bay (D) for anchoring (Fig 3).
- the vessels favour the near shore side of the bay, roughly half the distance (3nm from shore) out to the proposed farm site (A) (over 6nm from shore).
- vessels also will anchor further to the north.
- the largest vessels anchoring there are up to 120m in length and the swing arc of the vessels at anchor is up to 0.25nm (463m) in diameter.
- track lines patterns roughly east to west can be seen emanating from beyond Bell Rock (E) and inshore roughly to 3nm from the Fife coast. AIS data shows that these are likely anchor tenders working on the massive wind farm development some 36nm offshore that will run slow tracks back and forth east to west during poor weather, especially at night.

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04 Buoyage and Lighting Arrangement

Mara have held discussions and been advised by Northern Lighthouse Board (NLB), Marine and Coastguard Agency (MCGA) and Royal Yachting Association Scotland (RYAS).

The conventional system for marking aquaculture sites is by the installation at the seaward corners of Special Marks. These are large, yellow coloured floating buoys. They have a top piece of a yellow St Andrews Cross and solar panel charged battery powered lights which flash yellow at night.

On discussion with RYAS, it has been observed that the open water position of the St Andrews Bay farm site presents issues to vessels in transit, in that conventional Special Marks offer no navigational information other than their presence. A vessel seeing a yellow buoy or yellow flashing light will not know which buoy it is seeing or which side offers safe passage.

Cardinal Marks (Fig 4) are used to mark hazards and their colour and lighting set up offers information to the observer on where safe passage is available relative to their position. NLB have suggested the positioning of 4 Cardinal Marks around the site as an alternative to the special marks normally associated with aquaculture sites.

Mara have agreed that the site will be marked by 4 Cardinal Marks. Before any equipment is deployed at the proposed site, Mara will inform (as a license condition) The Hydrographic Office which maintains Admiralty paper and electronic charts so they can update accordingly. The aquaculture site will also be clearly marked on updated paper and electronic charts by a dotted line at its limits and a fish and cage symbol within. The exact position and type of the Cardinal Marks will also be given on charts (something not always present with Special Marks).

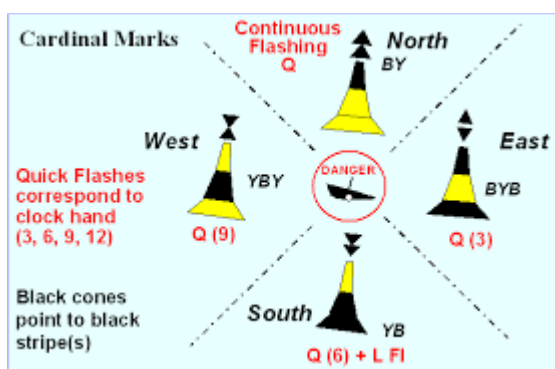


Fig 4 - Cardinal Marks

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05 Vessel Management Plan

Mara have prepared a Vessel Management Plan (VMP) for the Deployment and Operations phases of their proposed Seaweed Cultivation Farm in St Andrews Bay, off the Fife east coast.

05.01 Vessel types

To undertake the Deployment and operational work at the seaweed farm site, Mara will charter the following style of vessels. These descriptions are to allow Statutory Consultees and Stakeholders to visualise the impacts. The exact charter companies and the vessels they will use are to be determined as contracts cannot be fixed at this stage of project development. Due to distance and speeds, it is envisaged that all vessels will make one journey in a day.

During the deployment phases, Multicat - Dynamic Positioning (DP) work vessels will be brought in to accurately lay anchor blocks on the seabed. They are likely to be supported by smaller workboat or creel boat style vessels. The vessels are likely to work out of Dundee Port to load equipment on board and transit the site via recognised transit lanes used by other Marine Traffic. Harvesting and line checks are likely to use landing craft, local creel boats and small fast RHIB vessels from St Andrews or Tay Harbours.

05.02 Multicat

Specialised flat bed mooring vessel ~26m x 12m. Speed - <7 knots.

This style of vessel will be chartered to deploy the anchors, navigational marker lights, subsurface and surface farm structures and be integral in site inspection and maintenance/repair and as emergency response contract vessels for Mara. Highly versatile, they are fitted with Dynamic Positioning (DP) to accurately lay anchors in predesignated positions. May be supported by smaller vessels.



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05.03 Workboat

Versatile landing craft style vessel ~18m x 5m. Speed - <8 knots.

This style of vessel will be the primary workhorse for seaweed farm Operational phases. The vessels have a large deck space and deck cranes to deploy Growing Lines in the water and lift them again at harvest time. The decks will also contain harvesting machines and suitable containers for seaweed harvested and waste rope collected. May be supported by smaller vessels, used to occasionally visit the site to observe the structural integrity, take sample of seaweed from the site and support larger vessels.



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05.04 Creel boat

Local fishing fleet vessels around 10m to 16m. Speed - <8 knots.

This style of vessel will be used to visit the site to observe the structural integrity, whilst passing to or from their fishing grounds. They may occasionally take sample of seaweed from the site and support larger vessels. There is the possibility of these vessels being chartered to assist during deployment and operational phases.



05.05 Fast workboat

Rigid Hull Inflatable Boat (RHIB) or hard boat 8m to 10m. Speed - 20 knots.

This style of vessel will be used to occasionally visit the site to observe the structural integrity, take sample of seaweed from the site and support larger vessels.



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05.06 Vessel Transit Routes

The most likely ports to be used during all phases of work on or at the farm are from the Tay ports or St Andrews harbour (Fig 5).

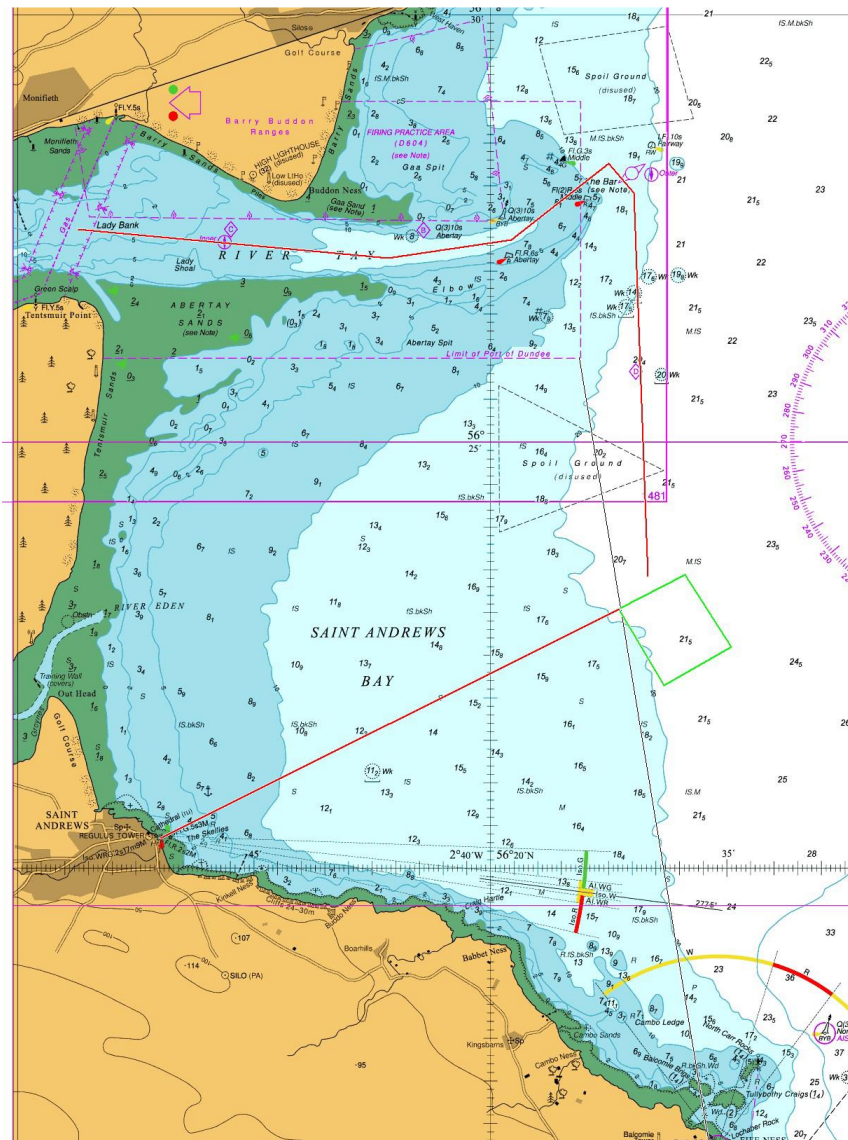


Fig 5 - Transit Routes (red) – St Andrews – 11km, Tay ports – 21km to farm (green)

There may be vessels coming to site directly from ports or sea areas further afield.

06 Longline Structures

To cultivate seaweed at their proposed farm site Mara intend to use a longline structure which is a basic system of 2 anchors holding a cantilever system taught (Fig 6). The surface structures are end floats with plastic poles, separating growing lines held subsurface. Small surface floats will also be interspersed at roughly 50m length along the structure for additional buoyancy. Future improvements could include a hybrid longline/grid system.

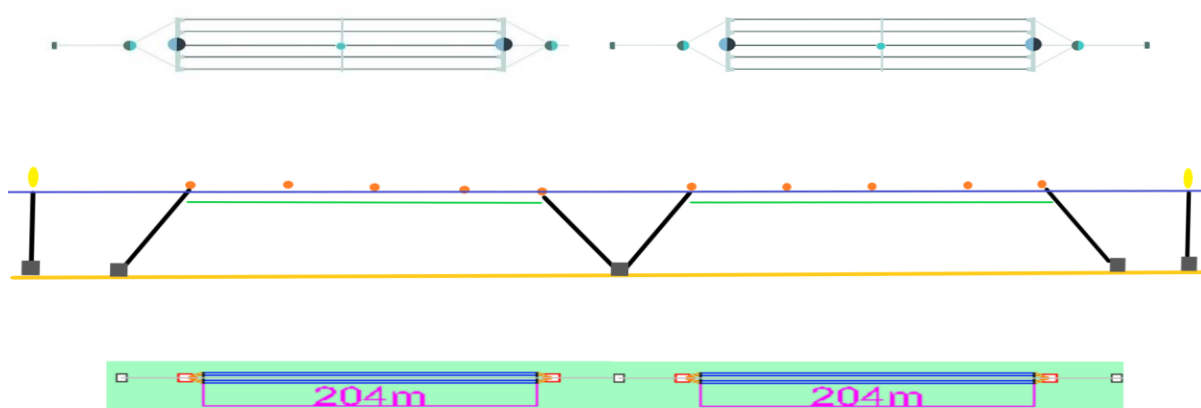


Fig 6 - Side and top view plan of longline system at St Andrews Bay site

The amount of seaweed each longline could produce is dependent on 2 factors;

1. The length of each longline (eg 200m).
2. The number of growing lines deployed (eg 1, 3 or 5).

So, for example, a 200m longline with 5 growing lines would grow 1km of seaweed (using an average of 8.6 kg per metre) giving 8.6 tonnes of seaweed.

Materials per Longline

Each unit (longline) will require 2 x anchor blocks. The size of which is likely to be 500kg steel anchors. This could be increased if low CO² concrete blocks are used as their displacement would be lower than steel.

A short length of heavy chain (6m x 32mm) from each anchor will attach to heavy rope (eg 32mm or 36mm Polysteel) up to a surface heavy float (eg 400L Aqua Buoy). A subsurface heavy rope (or possibly combination wire) will hold the two surface floats 200 metres apart and under tension in a cantilever shape (see above). Mara will then set out growing lines and poles as spacers between the 2 surface floats. The Growing Line ropes will likely be 12mm or 14mm polypropylene, creel style ropes, which will be cleaned and inspected before reuse after each growing season. Any ropes found suspect will be repurposed or disposed of ashore.

Mara will be supplied with Aquaculture spec materials from reputable industry suppliers (such as Gael Force Marine Equipment Ltd. All materials will be of a standard and dimensions the same as used for decades in the Scottish Aquaculture industry.

07 Mara Development Phases

07.01 Phased Deployment

The St Andrews Bay site is on the east coast of Fife approximately 6nm from St Andrews. The farm is planned to be deployed in 3 phases (Fig 7).

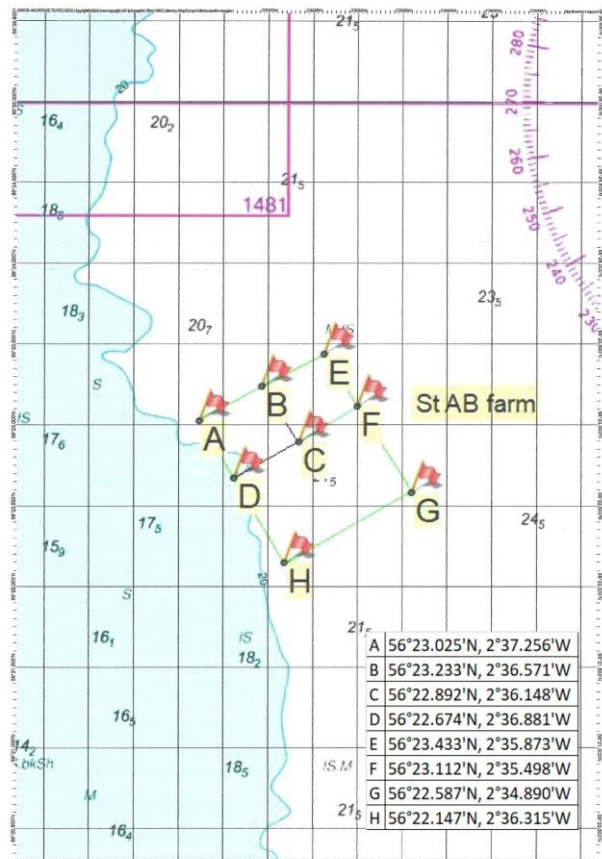


Fig 7 - St Andrews Bay map and Mara seaweed farm coordinates of the 3 phases of the farm.

Phase 1 – confined within the boundary points A, B, C, D

Phase 2 – confined within the boundary points A, E, F, D

Phase 3 – confined within the boundary points A, E, G, H

Mara have agreed with NLB that the Cardinal Marks will be kept close to the extreme boundaries of the deployed equipment. That means the Cardinal Marks will be moved further out from the site as each of the 3 phases are deployed.

Mara will ensure that before any new equipment is deployed for the new Phases, Mara will inform NLB, MCGA, Local marine users and The Hydrographic Office. The exact date will be given upon which the Cardinal Marks will be moved to their new positions. The Hydrographic Office will ensure that Admiralty paper and electronic charts are updated accordingly.

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07.02 Phase 1

Mara's desire is to have a substantial seaweed farm at the site. To do this, the aim is to develop a 1st Phase of up to 20 seaweed longline structures in June 2023 (Fig 8). Under advisement from Nature Scot, this timing has been altered from original timetable to avoid environmental conflicts. It is envisaged that the timing of this work will allow for predictable weather and long daylight hours to complete the work. It is hoped the work will take no more than 1 week for this phase of work.

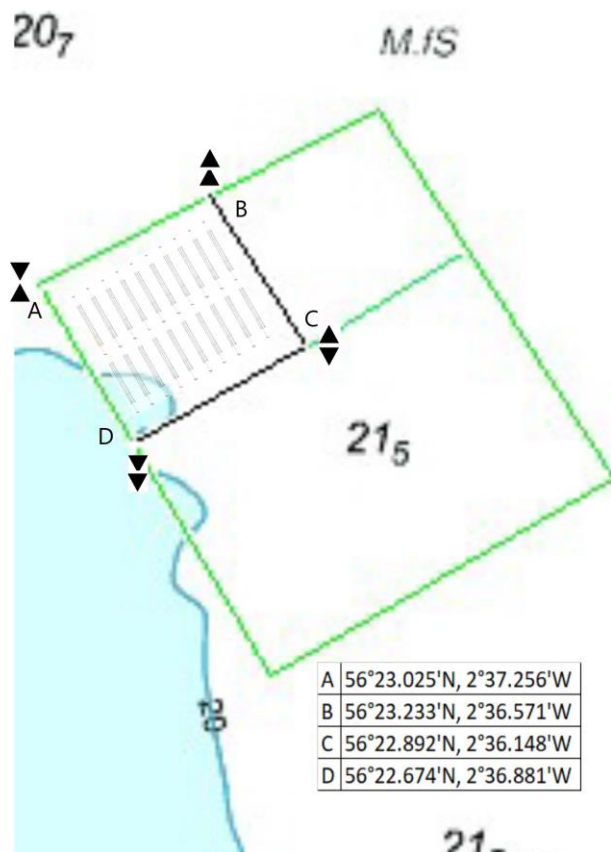


Fig 8 – coordinates of the Cardinal Marks and layout of longlines

07.03 Phase 2

A 2nd phase is envisaged for the years 2025 or 2026. This will see Mara potentially double the size of the farm with another 20 seaweed longline structures (Fig 9). As the seaweed farm begins to provide harvests for Mara's new processing facility in Glenrothes, Mara will evaluate the timing of the 2nd phase of development. If required a review of the impacts of the 1st Phase of the farm can be undertaken before development of the 2nd phase. This 2nd phase will see the deployment of up to another 20 seaweed longline structures. As before, under advice from Nature Scot, the timing of this work has been set for June. This will allow for predictable weather and long daylight hours to complete the work. It is hoped the work will take no more than 1 week for this phase of work.

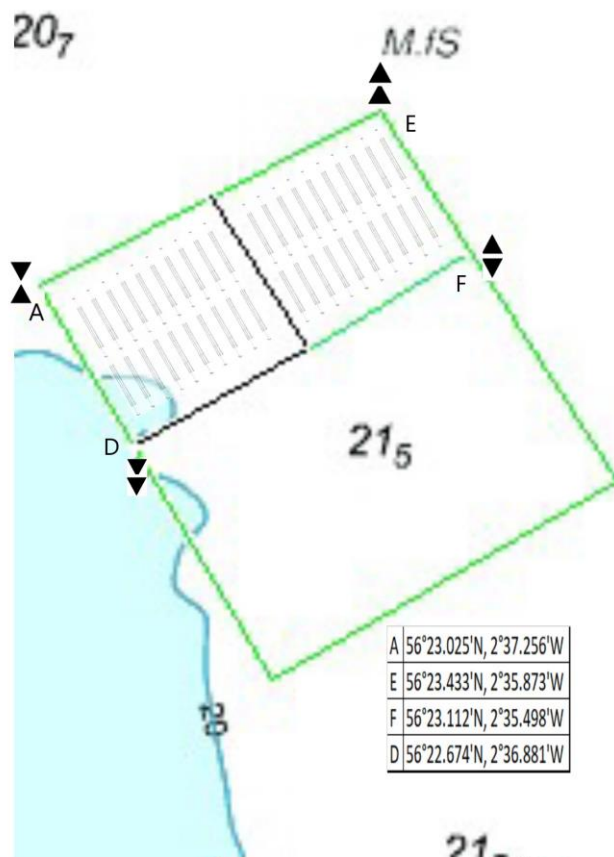


Fig 9 – coordinates of the Cardinal Marks and layout of longlines

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07.04 Phase 3

A 3rd phase in the years 2028 or 2029 will depend on how the market and business grows and these dates are a guide only (Fig 10). This 3rd phase would see an increase in the seaweed farm size by another 60 seaweed longline structures. If the scale of the farm is a concern to the Statutory Consultees and Stakeholders (most notably Nature Scot and RSPB), then Mara may separate the 3rd phase into a further license application so full scrutiny can be given to this 3rd Phase expansion of the farm. Again, it is envisaged that the timing of this work would be in June and take no more than 3 weeks for this phase of work.

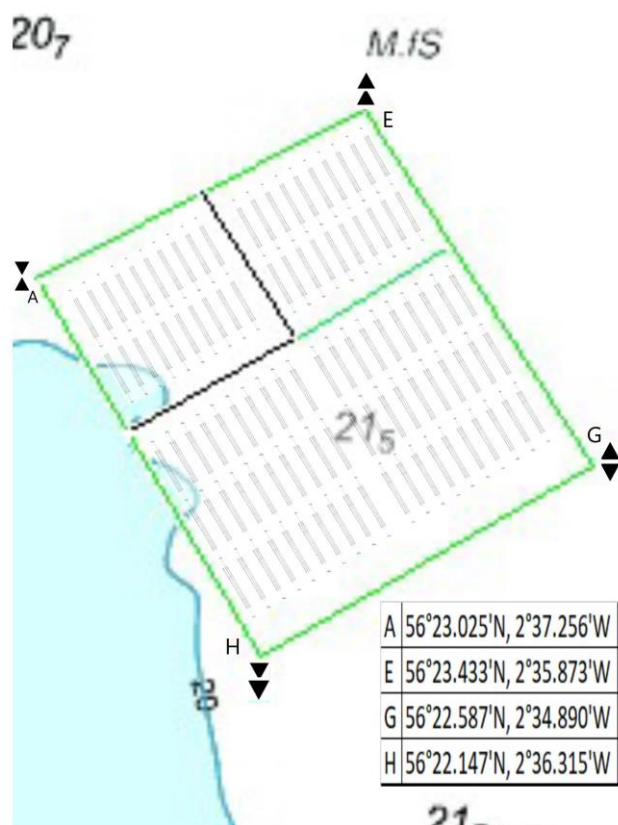


Fig 10 – coordinates of the Cardinal Marks and layout of longlines

The vessels employed during this period have the potential for 24 hour working but will be restricted to daylight hours only. This will give the highest visibility to crews to avoid collisions with local wildlife (a concern of Nature Scot). Also, the vessels employed are slow (<8 knots), allowing adequate reaction time for vessels and wildlife alike.

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07.05 Mara Operational Phases

Mara will undertake 2 main Operational Phases. Growing Line Deployment Phase and Harvesting Phase. A further Intermediate Phase will also be described for clarity. During the Operational phases, Workboat and Creel fishing vessels will be brought in to deploy Growing Lines and to Harvest seaweed.

They are likely to be supported by smaller RHIB or hard boat style vessels (both in Operational and used in an Intermediate Phase). The vessels are likely to work out of the smaller Tay or Fife coastal harbours such as Tayport or St Andrews harbours. The vessels will load and unload equipment and seaweed and transit the site via recognised transit lanes used by other Marine Traffic.

07.06 Growing Line Phase

Seaweed Cultivation is an overwintering crop with the deployment of seeded seaweed Growing Lines beginning in mid-October completed by mid-November each year. There is also the possibility of Growing Line deployment in late-January to early-February.

In Phase 1 Operations, it is expected that Growing Line deployment will take 1 week.

In Phase 2 Operations, it is expected that Growing Line deployment will take 2 weeks.

In Phase 3 Operations, it is expected that Growing Line deployment will take 5 weeks.

07.07 Harvesting Phase

The harvesting of the matured seaweed plants begins in early-March and ends in late-May.

1. In Phase 1 Operations, it is expected that Growing Line harvesting will take approximately 7 to 10 days of harvesting up to 20 tonnes per harvesting visit. Roughly 1 harvest vessel journey to the site per week.
2. In Phase 2 Operations, it is expected that Growing Line harvesting will take 14 to 20 days of harvesting up to 20 tonnes per harvesting visit. Roughly 2 or 3 harvest vessel journeys to the site per week.
3. In Phase 3 Operations, it is expected that Growing Line harvesting will take 35 to 50 days of harvesting up to 20 tonnes per harvesting visit. Roughly 4 to 7 harvest vessel journeys to the site per week.

The time window of Growing Line Deployment phases (1 week, 2 weeks and 5 weeks respectively) presents relatively short periods of work at the farm site. Also, the vessels employed are slow (<8 knots), allowing adequate reaction time for wildlife and other marine users.

Mara plan their Harvest phases (1st, 2nd and 3rd) in periods of Harvesting phases (10 days, 20 days and 50 days respectively). This represents relatively short periods of work at the farm site. The vessels employed during this period are slow speed at 7 or 8 knots. It is likely that vessels will not require to leave port before dawn and return to port in the dark and be able to transit



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and work at site in daylight as the timings are beyond the March Equinox (12 hours of daylight) and towards the longer days of approaching summer. This will give the highest visibility to crews to avoid wildlife collisions and safer transit amongst other marine users.

Mara is likely to use existing local creel boats for weekly checks on structure and lines and to take samples of growing seaweed. There will be occasions where Mara charter smaller RHIB or hard boat style vessels. These are faster than other vessels use (up to 35 knots) and as such present a potential risk for wildlife, themselves and other marine users. As such, Mara will insist that chartered vessels will restrict speeds to below <8 knots, only operate in daylight and keep a good all round lookout for hazards. This is much in line with the activities of fast craft operating as tour boats or aquaculture support vessels elsewhere around the coast.

07.08 Intermediate Phase

Outside of the Growing Line Deployment and the Harvesting phases or Operations, the seaweed farm will either be fallow or largely left unattended while the seaweed grows. Vessels will visit the farm weekly to inspect the site to check on the structures (part of the license conditions) and to check on plant growth and crop quality.

08 Hazards Log

Mara's proposed seaweed farm introduces a range of hazards to the St Andrews Bay area. Mara will attempt to identify all risks associated with their Development and Operations, introduce mitigation to reduce those risks and to then measure any residual risk that remains against an ALARP (as low as reasonably practicable) to ensure that all steps have been taken to reduce risks to a reasonable level. General hazards will include;

08.01 General Hazards

Hazard	Risk Details	Mitigation	Residual Risk/ALARP
01 - Site choice (course deviation and anchoring vessels)	<p>Traditional site markers for aquaculture sites (yellow Special Marks) are too ambiguous for marine users to understand what they will encounter.</p> <p>The knowledge of changes to the local navigation may not be known by all marine users.</p>	<p>Discussion with Northern Lighthouse Board and other stakeholders has concluded that Mara will use Cardinal Marks to give visual day and night navigational awareness to other marine users. Cardinal Marks also are charted with Lat/Lon positions on charts, and by their colour and night lights give safe passage information to vessels.</p> <p>Before the commencement of deployment of the 4 Cardinal Marks, Mara will contact UK Hydrographic Office, MCGA, Notice to Mariners (via Kingfisher), YRAS, local HM Coastguard and RNLI stations, local vessel users (via Marine Scotland Fishery Offices), local houses and on a signpost overlooking the harbour at St Andrews.</p>	<p>The use of Cardinal Marks significantly reduces risk at the site.</p> <p>Appropriate notification of changes will be given to all marine users in the area and wider information services informed.</p>
	<p>Confliction with other marine users</p>	<p>The farm site has been chosen for its suitability to grow seaweed, but also as it will inhabit a sea area that is away from busy shipping lanes. A regularly travelled transit lane from the outer North Carr east Cardinal Mark to the east of Fife Ness serves as the turning point for vessels entering and leaving the Firth of Forth.</p> <p>A line of tracks can be seen from there north to the outer Fairway Buoy that is the turning point for vessels entering and leaving the Firth of Tay marked navigation channel. This traffic is made up of a mix of sizes of commercial vessels and pleasure vessels. It was seen that some of the pleasure vessels cut a track further west as they near the entrance to the Firth of Tay,</p>	<p>The site choice has been made with reasonable allowance for the continuation of normal marine movements in and out of St Andrews Bay.</p> <p>Ample anchoring space remains in St Andrews Bay.</p> <p>Vessels moving through the area, even at night will</p>



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		<p>turning in to the channel early, between 2 of the port hand marks.</p> <p>There is a clear 500m distance between the most south and east corner of the proposed farm site (once all 3 phases are in place, over 900m when phase 2 is in place and over 1,700m when only Phase 1 is deployed.</p> <p>The St Andrews Bay area is of such large proportions (over 250 Km²) that even with the farm fully deployed, there is ample safe space for multiple vessels to anchor and still have room to make way should a vessel feel their anchor begin to drag.</p> <p>Most vessels favour the near shore side of the bay, roughly half the distance (3nm from shore) out to the proposed farm site (over 6nm from shore). Vessels also anchor further to the north.</p> <p>The largest vessels anchoring there are up to 120m in length and the swing arc of the vessels at anchor is up to 0.25nm (463m) in diameter.</p> <p>Track lines patterns roughly east to west can be seen emanating from beyond Bell Rock and inshore roughly to 3nm from the Fife coast. AIS data shows that these are likely anchor tenders working on the massive wind farm development some 36nm offshore that will run slow tracks back and forth east to west during poor weather, especially at night.</p>	<p>have clear visual information from the Cardinal Marks.</p>
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02 - Vessel collision	<p>Mara deployment or operational craft colliding with and third party vessels</p> <p>Collision between two third party vessels, due to displacement and deviation</p>	<p>(as much as reasonably possible) Mara will ensure that all vessel activities will be undertaken in daylight.</p> <p>The vessels that Mara will operate or lease will be appropriately coded and crewed at all times.</p> <p>The AIS data and local knowledge show that the vast majority of third party vessel movements occur over 3nm to the east of the proposed farm site. Most vessels entering the area will be looking for anchorage, rather than passage and as such radar and bridge watches will be on their highest level of alertness. (therefore of low incidence expected).</p>	<p>Daylight operations will lower collision risk significantly.</p> <p>Due to careful siting of the farm, there is a very low expectation of incidence.</p>
03 - Vessel allision	<p>Vessels entering the farm area and striking a fixed structure or buoyage.</p>	<p>Mara are deploying Longline Structures to grow seaweed. The bulk of the structure is subsurface (1m to 5m) with float at each end and at 50m intervals along their length. It is hoped that these lines are visible enough (with the Cardinal Marks at the outer corners) for any vessel to take avoiding action.</p> <p>If a large vessel (over 20m and or 50 tonnes) were to run into a longline it is likely the structure would give and the vessel would break through. Smaller vessels may find themselves stopped by the structure.</p> <p>Fouled propellers are likely to be a consequence of running through the Longlines whilst there are seaweed Growing Lines on them (Oct to May). This would be similar to a vessel picking up creel lines in their propeller.</p>	<p>As a well marked site (day and night), it is hoped that allision will be avoided.</p> <p>Should a vessel cross the Longlines, shallow draught vessels may pass over the top of the lines. Deeper draught vessels would likely break through them.</p>



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		Of the (approx. 330 Ha of licensed area sought, only 40 Ha of growing area is taken up by Longline Structures. The Longline dimensions are 20m wide by 200m long. They are spaced 65m apart width ways and 50m to 100m end to end apart in parallel rows. It is hoped that is a vessels finds itself within the Cardinal Marks and inside the farm area that this allows sea room for vessels to steam out or even turning and reversing course.	
04 - Subsequent vessel entanglement	Vessels entering the farm area become entangled in the subsurface Growing Lines, structure or buoyage.	<p>The main component of the farm will be Growing lines (Oct to May) which comprise of 5 x 200m lengths of creel type 12mm or 14mm polypropylene ropes.</p> <p>If a vessel is found to be entangled, these ropes can easily be cut by knives, grinders or propellor rope cutter (if fitted).</p>	<p>Should a vessel enter the farm site, with 65m spacing between lines, there is considerable room for vessels to navigate their way through the site.</p> <p>The soft polypropylene ropes would be easy to cut if vessels did become entangled.</p>
05 - Storm damage and maintenance	Heavy weather damage leading to loose lines that could break away and become a risk to shipping, wildlife or onshore waste	<p>Regular Inspection will alert to damage for remedial work to be carried out. In itself, this will not prevent serious structural failure, but will allow more storm resilience to the structure.</p> <p>The site will be visually surveyed as soon after a significant weather event as is safe to do so.</p> <ul style="list-style-type: none"> o Any minor damage will be repaired by Mara's site vessels. o Any major damage will be repaired as soon as operationally practicable, bringing suitable vessels onsite. 	<p>Site surveying, both regularly conducted and in response to a significant weather event, will quickly alert Mara to damage that has occurred and indicate remedial work to be conducted.</p>



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		A Notice to Mariners could be issued and local fishing and other marine users directly notified if reports of breakaway or loose structure are reported to or observed by Mara. As above, repairs will be affected as soon as operationally safe to do so.	NTM and direct communication of breakaway or loose structure will be issued.
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08.02 Construction and Decommissioning Hazards

Hazard	Risk Details	Mitigation	Residual Risk/ALARP
06 - Loss of mooring anchors/blocks during construction (or decommissioning)	<p>The loss of large structural pieces of equipment can be serious hazards to deep draught vessels in shallower water.</p> <p>Forgotten equipment would be a hazard to mobile fishing gear method vessels in future if site is abandoned.</p>	<p>Anchors will be around 500Kg, concrete blocks (if used) will be around 1 tonne.</p> <p>The Multicat vessels that will be chartered to undertake the deployment of the anchors will be from recognised industry marine services providers, such as Briggs (as yet unofficial). The deck cranes on even the smaller of their vessels will be rated to lift in excess of 13 tonnes.</p> <p>Anchor Pick-up lines will be attached to each as they are laid.</p> <p>The anchors will be laid with their riser ropes and surface floats attached.</p> <p>Should an anchor be lost overboard, these lines will be capable of allowing recovery.</p> <p>As the site is in 20m of water, in the event of a lost block, the marine service provider will record the Lat/Lon and arrangements will be made to recover the anchor by diver or ROV when operationally convenient.</p>	All equipment at site will be accounted for and recovered if lost.



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08.03 Operational Phase Hazards

Hazard	Risk Details	Mitigation	Residual Risk/ALARP
07 - Vessel entanglement	Working so closely to subsurface ropes presents a high risk of vessel entanglement (fouling of propellers or rudder).	<p>During the Operational phases (Growing Line deployment and Harvesting) Mara will use 2 vessels at the farm site. One sizeable Landing Craft and/or a local creel boat. There may also be a small RHIB in attendance during these periods.</p> <p>Should one of the vessels' propellers become fouled, the other attendant vessels can stand by whilst the lines are cleared. Towing the vessel clear of the lines, or to shore if required.</p>	Multi vessels working will allow immediate assistance if propeller fouling occurs.
08 - Man Overboard (MOB)	The loss of crew into the water, from slipping or falling or being knocked overboard.	<p>All vessels that Mara will operate directly or lease will be appropriately coded and crewed at all times. As such it is standard crew training procedure to go over MOB recovery and subsequent first aid and further care.</p> <p>All vessel operations will be conducted in low sea states to minimise vessel roll.</p> <p>All efforts will be made to ensure that over the side operations are conducted in a way that prevents crew from over reaching to grab lines or floats from the water.</p> <p>Personal flotation devices will be worn by all crew at all times on deck.</p> <p>Any incidents will be reported as appropriate through Mara's own internal incident process and beyond as required.</p>	<p>All vessels will be drilled in appropriate MOB procedures.</p> <p>All efforts will be made to avoid activities that raise the risk of MOB.</p> <p>Any MOB casualty will be treated immediately and records of the incident kept and made available.</p>



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08.04 Intermediate Phase Hazards

Hazard	Risk Details	Mitigation	Residual Risk/ALARP
9 - Site checks and integrity	These checks are likely to be undertaken by sole vessels. The above duplication of vessels for assistance is therefore not available.	Any vessels undertaking this duty will be instructed to maintain speed to maintain good steerage, but to stay slow enough and far enough away to be able to react to avoid collision and possible entanglement.	Visual inspections from a safe distance. Binocular or drone checks.
10 - Site maintenance		During any site checks, if lines or floats are found to be adrift, the skipper's discretion will be used to determine whether it is safe to come along side the structure and make a temporary or permanent repair. If it is deemed inappropriate due to weather, visibility or any number of other factors, the skipper will report back directly to Mara as soon as a reasonable possible for Matra to organise a permanent repair.	Skipper's discretion at all times on safety of operations. Alternative craft will be charter as required.
11 - Sampling visits		Sampling visits will inevitable require vessels to manoeuvre alongside the farm structure. As above, the skipper's discretion will be used to determine whether it is safe to come along side the structure and take samples for Mara. It may be deemed inappropriate for this activity to be done with one vessel alone. Or only a duty that can be performed by a small RHIB style vessel with very shallow draft and the ability to raise an outboard engine to clear any propeller fouling.	Skipper's discretion at all times on safety of operations. Not to be undertaken at anything approaching or above sea state 3.



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		Weather/swell conditions at the site will mean that regardless of which style of vessels undertakes this activity, it is unlikely to be safe to do so at anything approaching or above sea state 3.	
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08.05 Local User consultation

Mara are aware that several organisations have raised concerns about the preparation in place for such a significant offshore structure in a area of sea that few are used to experiencing aquaculture sites. As such Mara will send this report to local marine users once it has be approved by MCGA and UK Chamber of Shipping, whom Mara have written this under the guidance of.

Mara hope that this will show that they wish to work alongside the local marine users and with them and have a safety conscience approach to their marine operations. Indeed Mara wish to engage local fishing vessels in work at the farm site. This may be as simple as paid work to visually check the site from a safe distance and report back defects.

This is not without precedent as Scottish Fishermen's Federation (SFF) website <https://sffservices.co.uk/guard-vessels/> offer fishing vessels being used as guard boats for pipeline or structure work in power, oil and gas industry, with The National Federation of Fishermen's Organisations website <https://www.nffoservices.com/guard-vessels/> showing minimal additional costs and checks for the fishermen (beyond required MCA safety checks) and without the need to recode vessels as workboats.

Mara have also enquired into dual coding of existing fishing vessels with additional workboat coding, to allow various activities near or at the farm site. The grant - <https://www.gov.uk/guidance/apply-for-the-uk-seafood-fund-infrastructure-scheme-round-3>, (by their description of funded aid given) would be approachable as a means of diversifying and modernising the existing fishing fleet. Mara are seeking clarification.

This could also possibly allow vessels to perform a limited activities at the farm site. The grant may also allow for some small changes to deck machinery layout, ropes leads and pulleys, allowing safer working whilst alongside the site. This would obviously be on a case by case basis with MCA involvement and detailed planning of limitations of work to undertaken to correspond with vessel, crew capability and weather conditions.



09 Monitoring Arrangements

Mara will ensure that the seaweed farm at St Andrews Bay will be regularly inspected by certified mooring specialists. A provision will be made for the continuous monitoring of the Seaweed Farm outwith its operational growing period. The site will be regularly visited by farm operatives by vessel.

A record of visits and inspections will be kept by Mara and made available to any inspecting MCA staff on request (Fig11).

Site Name	St Andrews Bay			
Date	Observer	Observation	Comments	Staff
17/11/2022	Argyll Aquaculture	Visit to site during installation	Special marks installed	SJ, DDC
18/11/2022	Argyll Aquaculture	Installation by Inverlussa Marine	Anchor lines installed	SJ, DDC
19/11/2022	Argyll Aquaculture	Installation by Inverlussa Marine	Floater lines installed	SJ, DDC
20/11/2022	Argyll Aquaculture	Installation by Inverlussa Marine	All lines in place and tight	SJ, DDC
27/11/2022	Mara	Regular line check by boat	All lines in place and tight	Mara staff
05/12/2022	Mara	Regular line check by boat	All lines in place and tight	Mara staff
15/12/2022	Mara	Regular line check by boat	All lines in place and tight	Mara staff
22/12/2022	Mara	Shore observation	Special marks working, all floats in place	Anon
08/01/2023	Briggs Marine	Dive survey of lines	All joints and swivels intact	Briggs Marine staff
11/01/2023	Mara	Deployment of seaweed lines	All lines and floats in place and tight	Mara staff
18/01/2023	Mara	Regular line check	All lines and floats in place and tight	Mara staff

Fig 11 - An example of monitoring records

It is essential that the navigational and health and safety regulatory expectations for mooring systems are set in proportion to the potential risks with a view to develop a safe and sustainable seaweed growing platform for the long term. To do that Briggs Marine (as yet unofficial), with over 20 years experience in design, installation and maintenance of marine structures will deploy a bespoke designed Seaweed Farm for Mara (Fig 6) that uses oversized ropes, chains and anchors to ensure the structure;

- can withstand such forces acting on it as are reasonably foreseeable including;
 - Environmental conditions, e.g. winds, waves, tidal currents
 - Loads during operational conditions including normal operation, contact loads from access boats and temporary loads during maintenance operations.
 - The weight of the installation and anything on it, buoyancy, drag and inertia forces from movement
 - Unplanned incidents including vessel impact
- its construction, commissioning, operation, modification, maintenance and repair of the Seaweed Farm may proceed without prejudicing the structure's integrity.
- in the event of reasonably foreseeable damage to the installation or its moorings, it will retain sufficient integrity to enable action to be taken to organise appropriate safe repair, thus preventing mooring failure (thereby becoming a navigational hazard).
- it may be decommissioned and dismantled safely.

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10 Decommissioning Plan

Mara have been trading since 2012 and are investing heavily in the Seaweed Cultivation industry. The seaweed harvest this Farm will grow, will become high value ingredients across multiple product lines. Mara are developing in parallel to the Seaweed Farm, onshore facilities for the movement and processing of their product. Mara are already a successful trading company with good product placement in the market. The cultivation of seaweed at their new seaweed farm will strengthen their supply of seaweed. The Seaweed Farm design has been made with long service in mind. The use of heavy ropes rather than chains will allow a decade or more of operation before major replacement of parts are required.

Mara Seaweed Ltd have in place a Lease Option Agreement with Crown Estate Scotland for the proposed seaweed farm site in St Andrews Bay. Part of that agreement consists of practical and financial arrangements agreed between Mara and Crown Estate Scotland on a Site Decommissioning Plan in the event that Mara choose to give up the site, Crown Estate Scotland revoke their Lease or that Mara become insolvent.

The 2023 indicative costs as provided by the marine engineering company that conducted the Acoustic Doppler data gathering and subsequent farm robustness analysis in order to decommission the site are as follows:

Farm Capacity	Infrastructure	Decommissioning Costs
20 longlines	40 Anchors + 4 nav marks	£50,000
40 longlines	80 Anchors + 4 nav marks	£80,000
100 longlines	200 anchors = 4 nav marks	£170,000

Mara would like to mirror this arrangement with Marine Scotland as their commitment to a Site Decommissioning Plan as part of the licensing consent process through MS-LOT. The commitment made as a condition of receiving the CES LOA is that Mara will ensure it retains sufficient funds to decommission the seaweed farm in proportion to the number of farm units installed.

Mara will update the decommissioning cost estimates as the infrastructure is deployed and annually thereafter to ensure it has the resources to decommission the farm as and when the business conditions require this.

It is agreed that Mara staff would use local vessels to remove all surface structures. These are light floats and longlines and would not require specialist vessels. Materials removed would be stored or disposed of ashore following all waste and environmental considerations fully.

Subsurface anchors would be lifted by a chartered specialist vessel. Costs would be born by Mara to mobilise suitable vessel to site, lift risers and recover anchors.



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With pre-discussion with Northern Lighthouse Board/Marine and Coastguard Agency, navigation marks, risers and anchors would be removed from site. Materials removed would be stored or disposed of ashore following all waste and environmental considerations fully.

11 Emergency Response Plan

This plan will exist both here for information and as a stand alone document that will be circulated to local HM Coastguard and RNLI stations, local vessel users, local houses and on a signpost overlooking the harbour at St Andrews.

Emergency scenarios and response

- vessel stranding – in the event of a vessel entering the Seaweed Farm exclusion zone and colliding with the Farm structure, the first concern is the safety of the vessel and crew. 999 should be called and the coastguard/RNLI informed. MARA should also be contacted (number below) and repairs to the Farm structure will be enacted.
- cetacean entanglement – in the unlikely event of a seal, whale, dolphin or basking shark becoming entangled in the Seaweed Farm lines, The British Divers RESCUE HOTLINE: 01825 765546 should be called - <https://btmlr.org.uk/>
- float loss – occasionally, some line floats may become detached from the Seaweed Farm structure. This will not degrade the integrity of the Farm structure, but Mara should be contacted (number below) so the float can be recovered and the replaced back where it came from.
- Storm damage/loss of integrity of the structure – the design of the Seaweed Farm is such that multiple anchor lines hold the structure in place and the loss of several of these lines would not degrade the integrity of the Farm. But should it be observed that the Farm structure has been damaged or worse, lost from its moorings 999 should be called and the coastguard informed. Mara should also be contacted (number below) and emergency repairs to the Farm structure will be immediately enacted. Local vessels (fishing and aquaculture boats) will be retained as emergency response and ropes, floats and other equipment held in preparation for such emergency repair at Mara shore base 5 miles to the west.

Mara Contact details (to be contacted in all scenarios)

Daniel Bull-Clearie - Production Manager – a duty number will be assigned

Fiona Houston – Director/Founder – a duty number will be assigned



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MARINE EMERGENCY ACTION CARD

For Mara – St Andrews Bay Seaweed Farm

Development summary (include details of the design, numbers of units/structures, mooring arrangements, subsea information, etc.) A full description including diagrams must be included below.

Emergency Contact

One of the following or a combination of both, must be 24/7

Duty Holder name	Daniel Bull-Clearie
Primary number	a duty number will be assigned
Secondary number	a duty number will be assigned
Media relations (if applicable)	n/a
Coastguard	999
Police	999

Insert a picture/drawing of the device

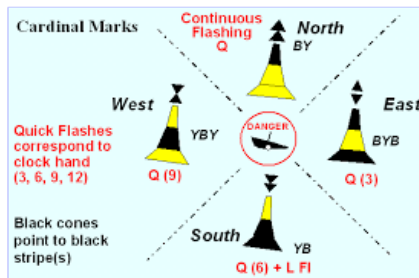
See attached diagram of Cardinal Marks and specification of light below

Development location

Range & Bearing from land	EbyN 6nm
Dimensions of the area	Variable over time
Number of devices	4

Device Specific information (adapt to suit the device)

Heights/depths (m and ft)		Lights / Markings	
Height above sea level	Focal height of light 2420mm	Lights - White	N - Q S - Q (6) + L Fl E - Q (3) W - Q (9)
Depth below surface	1.2m	4 x Y/B Cardinal Marks	North - Black/Yellow South - Yellow/Black East - Black/Yellow/Black West - Yellow/Black/Yellow
Height above seabed	22m OD		



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<p>Details of regular maintenance activities</p> <p>Weekly visual inspection from shore or vessel. Records will be kept for inspection by Mara. See example sheet in details.</p>	<p>Summary of number of personnel working offshore and emergency response capabilities</p> <p>Site is fallow until October, There will be no work done at site until then.</p>
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<p>Details of vessels operating to/from the development – include name, callsign, description, communications (e.g. channels used), number of crew, operating limits, etc.</p> <p>No vessels are yet owned by Mara. Operations at the site begins in October. This form will be updated as staff and vessels are assigned to the work.</p> <p>Various vessels will keep visual contact on site as they pass. Local fishing vessels will visually inspect site regularly. Records will be kept for inspection by Mara.</p>

Personal SAR Locating Device Make & Model				
Functions: yes/no	COSPAS-SARSAT	AIS	DSC	121.5MHz
	n/a	n/a	n/a	n/a

<p>Additional information pertinent to the development</p> <p>No vessels are yet owned by Mara. Operations at the site begins in October. This form will be updated as staff and vessels are assigned to the work.</p>
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