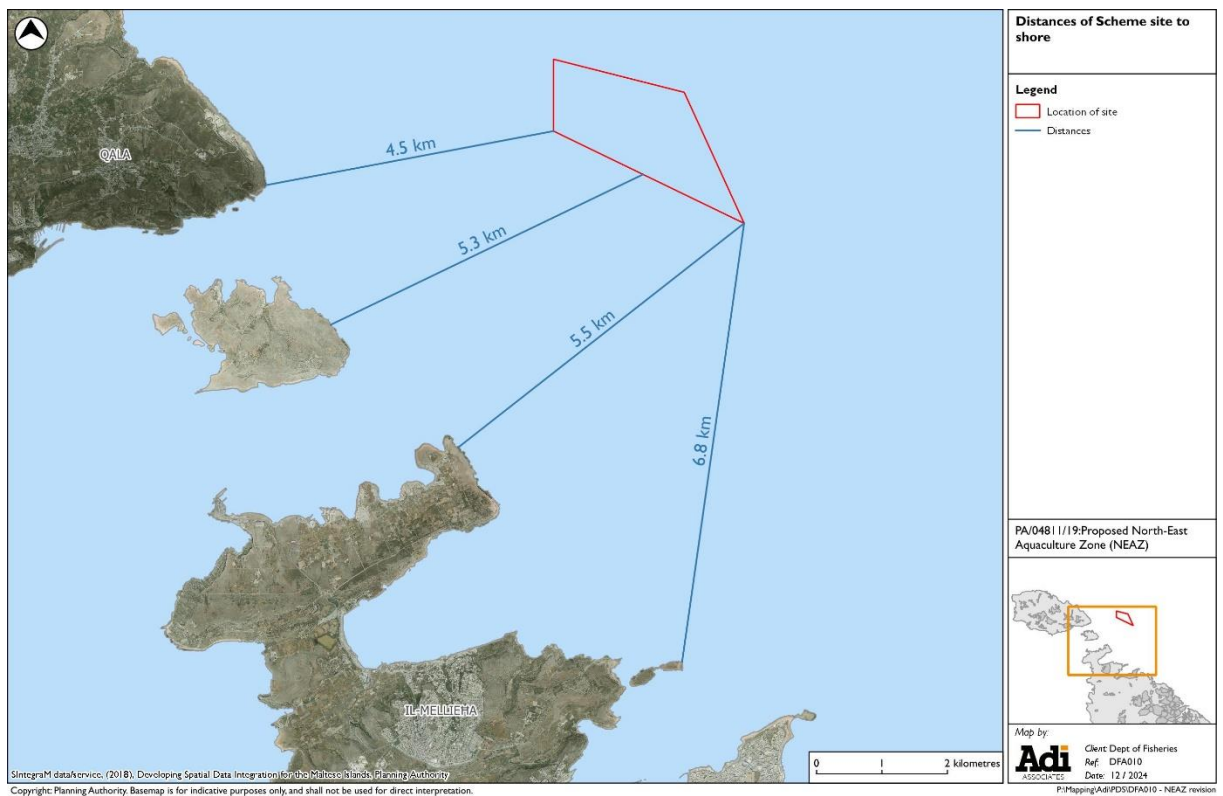


**PA/04811/19**

**PROPOSED NORTH-EAST AQUACULTURE ZONE (NEAZ) INTENDED FOR THE FARMING OF SPECIES OTHER THAN TUNA**

**PROJECT DESCRIPTION STATEMENT**



**Version 1: January 2025**



**Report Reference:**

**Adi Associates Environmental Consultants Ltd, 2024. PA/04811/19 - Proposed North-East Aquaculture Zone (NEAZ) intended for the farming of species other than tuna. Project Description Statement. San Ġwann, January 2025; v + 26pp.**

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## Quality Assurance

### Proposed North-East Aquaculture Zone (NEAZ) intended for the farming of species other than tuna Project Description Statement January 2025

Report for: **Department of Fisheries & Aquaculture**

#### Revision Schedule

Rev	Date	Details	Written by:	Checked by:	Approved by:
00	Jan 2025	Submission to client	<b>Adrian Mallia</b> Managing Director	<b>Eilis McCullough</b> Senior Planning Consultant	<b>Rachel Xuereb</b> Director

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## INTRODUCTION

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1. This Project Description Statement describes a proposal for the establishment of an Aquaculture Zone (AZ) in the northeast of Malta for the rearing of fish species other than Atlantic Blue Fin Tuna. The proposal is being taken forward in a Full Development Permit application (PA/04811/19). This Project Description Statement (PDS) has been requested by the Environment and Resources Authority (ERA).
2. The project is proposed by the Department of Fisheries and Aquaculture (DFA) within the Ministry for Agriculture, Fisheries and Animal Rights (MAFA), hereinafter referred to as 'the Applicant'; the site is hereinafter referred to as 'the Scheme site' and the proposal is hereinafter referred to as 'the Scheme'. **Figure I** shows the location of the Scheme site.

## BACKGROUND

3. The Full Development Permit application was submitted in March 2019, originally for a *“Proposed North Aquaculture Zone intended to relocate tuna farms in the North of Malta for a total biomass of approximately 5,000 tonnes of fish.”*. This was the culmination of a process that commenced a number of years earlier that aimed at identifying a location for the establishment of an Aquaculture Zone in the north of the island, following the success of the South-east Aquaculture Zone (SEAZ) established offshore at Żonqor Point in 2006.
4. Following the success of the SEAZ, and the persistent complaints from coastal users on the tuna farming operations in St Paul’s Bay, in 2011, the DFA embarked upon a plan to establish an aquaculture zone in the north, which would allow the relocation of the tuna farms there (i.e. off St Paul’s Bay and the tuna penning farm formerly located in the South Comino Channel), to a more offshore location. The proposed north aquaculture zone would have an area (at sea surface) of 3 km x 1.5 km and would be capable to support fish farming units for a total production of some 4,500 – 5,000 tonnes of fish. The first steps involved a site selection exercise to identify such a possible location. The exercise included detailed marine surveys, as well as a sieving exercise to identify suitable locations for the zone based on technical, environmental, and social criteria<sup>1</sup>.
5. Following the preparation of the site selection exercise in 2011, the process for establishing the North Aquaculture Zone (NAZ) was stalled and temporarily shelved in view of conflicts with the offshore wind farm being proposed at the time and difficulties in terms of conflicts with other coastal users.
6. In September 2016, following several reports over the summer months related to

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<sup>1</sup> Adi Associates Environmental Consultants Ltd, 2011. Proposed Aquaculture Zone, North East Malta. Alternative Site Assessment and Project Description Statement (Version 1) San Gwann, May 2011; v + 25pp.

pollution from fish slime in most of the eastern seaboard of Malta, the Planning Authority revoked all tuna penning permits and ordered all tuna farms to relocate further offshore<sup>2</sup> and into existing aquaculture zones by May 2017 in order to mitigate the impacts from the farming operations on the marine environment, including social impacts related to amenity and nuisance from odour and water quality at affected areas of the coast

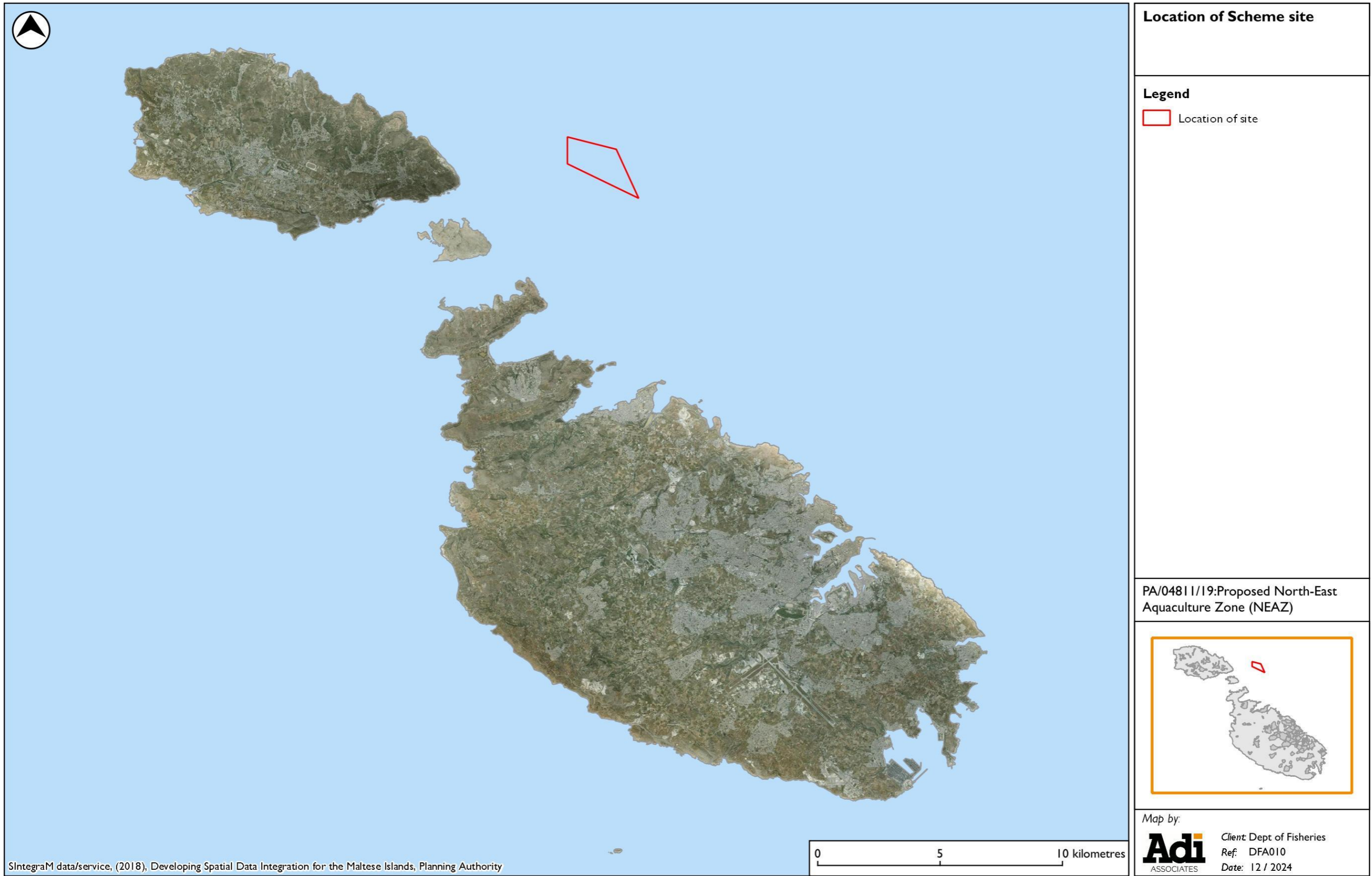
7. The PA's decision resulted in the two southern tuna farms then located close to shore to relocate to the SEAZ, which led to this zone, which already included another farm, reaching its allocated biomass of 9,000 tonnes. This meant that the tuna farms located in the north (south Comino Channel and St Paul's Bay) could not relocate to the SEAZ. In view of this, the tuna operators in the north submitted development permit applications to relocate to a site further offshore to meet the 4.5 – 5 km criterion set by the PA; while the DFA re-activated the process to establish a NAZ.
8. In 2019, the DFA submitted a development permit application (PA/04811/19) for the establishment of a North Aquaculture Zone for a total biomass of 5,000 tonnes to accommodate these relocations. This application (PA/04811/19) was the subject of an Environmental Impact Assessment process requested by the ERA. In the meantime, in 2018, AJD Tuna Ltd, the operators of the tuna farms located in the north of the island, submitted separate applications to relocate the farms to a temporary location located 5 km off the coast of St Paul's Bay, just beyond Is-Sikka l-Bajda (PA/03072/17, PA/05858/17, PA/02175/18).
9. The various marine studies undertaken for the EIA, as well as extensive stakeholder consultations undertaken throughout the EIA process, led to the identification of a preferred location that could accommodate the proposed c. 4.5 km<sup>2</sup> zone, while minimising conflicts with other marine uses and environmental considerations (see **Figure 2**).
10. Following the conclusion and approval of the EIA by ERA, the application was meant to be determined by the Planning Authority but was put on hold indefinitely in view of objections, especially from the Qala Local Council, since the proposed location was closer to the Gozo coastline than the temporary location currently used by AJD Tuna Ltd.

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<sup>2</sup> Farms were required to relocate to not less than 4.5 – 5 km from the shore.



Figure 1: Location of the Scheme site



## POLICY GUIDANCE

11. In 2021, the European Commission (EC) published the “Strategic guidelines for a more sustainable and competitive EU aquaculture for the period 2021 to 2030”, in line with Article 34 of the Common Fisheries Policy, which mandates the EC to adopt non-binding EU strategic guidelines on common priorities and targets to develop sustainable aquaculture activities in the EU. It also calls on EU Member States to draw up multiannual national strategic plans to develop aquaculture in their territories using the strategic guidelines as a basis.
12. In 2022, a Multiannual National Plan for the development of Sustainable Aquaculture 2022-2030 (MNPSA) was adopted by the Government of Malta. The MNPSA takes into account the EU Strategic guidelines and related EU policy initiatives as well as the lessons learnt over the past years, new contextual realities and new aquaculture technologies and solutions, to lay out a framework of operations for 2022-2030 and to ensure that the aquaculture industry and all relevant stakeholders in Malta continue to progress despite the existing global challenges that are affecting this sector. The primary scope of the MNPSA is to provide a roadmap of where Malta’s aquaculture sector shall be heading in the upcoming years, with the end scope to develop a diverse portfolio of feasible and sustainable options for a more competitive and resilient aquaculture sector that develops in balance with good environmental practices and societal expectations (MAFA, 2022<sup>3</sup>).
13. In 2024, the DFA and the MAFA, embarked on an EU-funded assignment under the Technical Support Instrument (TSI Regulation) in the area of sustainable aquaculture. This project, funded by the European Union via the Technical Support Instrument, managed by the European Commission Directorate-General for Structural Reform Support, aims to support the DFA by developing an evidence-based action plan covering the period up to 2030 that builds on progress achieved through the implementation of the Aquaculture Strategy for the Maltese Islands 2014–2025 and will build on and support the implementation of the MNPSA. The project, which has been commissioned to KPMG Malta, has the following objective:

*“Mindful of the European Union’s strategic guidelines and the industry’s role in the green transition, the action plan will address past challenges while considering emerging sectoral trends to develop targeted management solutions and reshape public perception. By implementing the recommendations provided, the project will aim to promote the sustainable development of a competitive and resilient aquaculture industry, leveraging market opportunities to grow the sector”.*

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<sup>3</sup> Ministry for Agriculture, Fisheries and Animal Rights, 2022. Malta’s Multiannual National Plan for the Development of Sustainable Aquaculture (MNPSA), 2022-2030; Malta, 29pp.

## **THE CURRENT PROPOSAL**

14. Following the change in approach to embrace a more sustainable type of aquaculture and diversifying new operations away from the tuna industry, the DFA decided to pursue the establishment of an Aquaculture Zone in the same location as was considered in the EIA for PA/04811/19 but excluding bluefin tuna from the list of species that could be reared in the zone.
15. The development permit application was retained and the description amended to: “Proposed North-East Aquaculture Zone (NEAZ) intended for the farming of species other than tuna”.
16. In view of this change, the original application was re-activated and following consultations with ERA on the proposed new approach the Authority requested a new Project Description Statement to describe the new proposal and to screen it for EIA. This request was made on 2 September 2024, as follows:

*“A meeting was held on 28 August 2024 at the DFA (Ghemieri) between ERA, DFA and EIA Coordinator.*

*An overview on a proposal for an aquaculture zone in the NE of the Maltese Islands for various fish species, other than tuna was provided. During the meeting various points were raised, namely the justification, alternative sites and the EIA process. The proposal would require an EIA. It was also outlined that any existing studies (baselines) can be used as long as these are still relevant. At this stage, a PDS would be required to kick start the process”.*

## **OBJECTIVES OF THE SCHEME**

17. The Applicant explains the following in respect of the objectives for the Scheme:

*“The Northeast Aquaculture Zone (NEAZ) represents a strategic effort to harmonize aquaculture development with environmental stewardship and economic advancement. By designating specific areas for aquaculture, the NEAZ aims to streamline operations, reduce conflicts with other marine users, and promote responsible resource use. This initiative is particularly focused on high-value species that can open up new niche markets, encouraging innovation and diversification in aquaculture practices.*

*A core component of the NEAZ is its commitment to sustainable practices. By prioritising environmentally friendly methodologies, the initiative not only seeks to minimise the ecological impact of fish farming but also ensures the long-term viability of marine ecosystems. This includes the incorporation of advanced technologies that can enhance production efficiencies while simultaneously protecting natural habitats. Additionally, the NEAZ intends to deliver socio-economic benefits to local communities. By fostering job*

*creation and attracting responsible investment, the initiative aims to empower stakeholders and ensure that the economic advantages of aquaculture are widely shared. This inclusive approach will help build resilient local economies and support community involvement in sustainable seafood production.*

*Overall, the NEAZ aims to create a balanced framework that promotes profitable aquaculture while safeguarding environmental health, providing a model for sustainable growth in the sector. Through collaboration among stakeholders and adherence to best practices, the NEAZ has the potential to set a precedent for future aquaculture initiatives.*

## **ALTERNATIVES**

18. The current proposal is an alternative to that proposed in 2019, since, albeit the proposal is still one for an aquaculture zone, it eliminates the rearing of bluefin tuna. The rearing of tuna is substantially different from closed cycle species aquaculture in that it does not involve the hatching of the species and its growth to maturity, but it is based on capture fisheries, with the tuna being caught on the high seas and kept in cages for a few months for conditioning and fattening prior to harvesting. Another major difference lies in the type of feed given to the different species, with tuna fed frozen baitfish and most of the other species fed artificial formula feed<sup>4</sup>.
19. As regards the location of the site, this was arrived at following a detailed site selection exercise undertaken by the DFA in 2011, which was aimed at identifying a site in the north of the island, ostensibly for the rearing of bluefin tuna. Following the change in direction towards a more sustainable aquaculture, which eliminated tuna farming from the equation, this same site is now being considered for the Scheme, also in view that it had been the subject of detailed studies in the previous EIA.
20. Through the TSI assignment referred to earlier, the consultants leading that exercise re-evaluated the site proposed for the NEAZ as well as other sites that had been considered in the previous Aquaculture Strategy (MSDCC, 2014<sup>5</sup>) and discarded as not suitable for tuna farming or other species that were being farmed at the time and assessed them for their suitability as aquaculture sites in general and especially for the rearing of the new list of potentially farmed species (see

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<sup>4</sup> It is to be noted that there have also been recent advances in artificial feed formulation specifically for tuna. (see for example: [MaGro for tuna - Skretting](#)). This could be a game changer for the tuna industry and its environmental and social impacts.

<sup>5</sup> Ministry for Sustainable Development, Environment, and Climate Change, 2014. Aquaculture Strategy for the Maltese Islands. Towards Sustainability – 2014 – 2025; 18pp. (<https://sustainabledevelopment.gov.mt/wp-content/uploads/2021/10/Aquaculture-strategy-2014-25.pdf>; last accessed, 13/12/2024)

below).

21. This exercise identified 13 other sites that could be considered for future aquaculture development. This sit evaluation exercise is still ongoing and will be subject to further stakeholder consultation; however, at this stage of the exercise, the NEAZ location subject of application PA/04811/19 is considered by DFA to be the most suitable location for this type of venture.

## DESCRIPTION OF THE SCHEME

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### LOCATION OF THE SCHEME SITE

22. The proposed Scheme site is the same location that had been proposed for the North Aquaculture Zone when it was planned to relocate the existing tuna penning sites off Is-Sikka l-Bajda (see **Figure 1** above). The site lies east of Qala Point and northeast of Comino and L-Aħrax coastline in Mellieħa.
23. Though the Scheme boundary is shown in **Figure 1**, the individual farm areas will depend on the species to be farmed and the size of the farm, since different species may require different sized cages and hence, a larger or small area for the farm. The site also lends itself to future expansion (especially in a northerly direction), if required and depending on the mooring technology adopted. At this stage, the closest (plan distance) to shore is 4.5 km from the shore at Qala Point, Gozo. The Scheme site as currently envisaged is also 5.3 km from the east coast of Comino, 5.5 km from L-Aħrax coastline, and 6.8 km from Selmunett islands (see **Figure 2**).
24. The site is also located 1.4 km to the northwest of the site occupied by the tuna farms operated by AJD Tuna Ltd off Is-Sikka l-Bajda (see **Figure 3**).

### CHARACTERISTICS OF THE SCHEME SITE

25. The Scheme site covers an area of approximately 5 km<sup>2</sup> within which a maximum of 40,000 tonnes of fish will be able to be reared (depending on the species mix). The NEAZ will be located off the drop-off in water depths ranging from 135 to 150 m (see **Figure 4**). The bathymetry at the Scheme site is generally flat with a shallow slope towards the north. The seabed beyond the drop-off consists of very fine mobile sediments defined as Mediterranean communities of muddy detritic bottoms in the EUNIS classification (EUNIS Code A5.38) (**Figure 5**).
26. The location of the Scheme site takes into consideration and avoids any overlap with the bunkering area located off the northeast coast of Malta as well as the 8 nm AFM firing arc danger area (see **Figure 6**).
27. The Scheme location lies within marine protected areas (Special Area of Conservation: Żona fil-Baħar fil-Grigal ta' Malta, and Specially Protected Area: Il-Baħar ta' madwar Għawdex) (see **Figure 7**). The area was also surveyed through remote sensing for the presence of any marine archaeology features in the original EIA undertaken for PA/04811/19. Although three targets were identified, which could potentially be World War II aircraft crash sites, none were located within the Scheme site (Adi Associates, 2018<sup>6</sup>).
28. There are no other known designated uses or infrastructure at the Scheme site.

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<sup>6</sup> Adi Associates Environmental Consultants Ltd, 2018. GF00250/07: Proposal for a new aquaculture zone in the North of Malta, Zone offshore Malta. Environmental Impact Assessment Report. San Gwann, November 2018; xvi + 229pp + 1 Appendix.

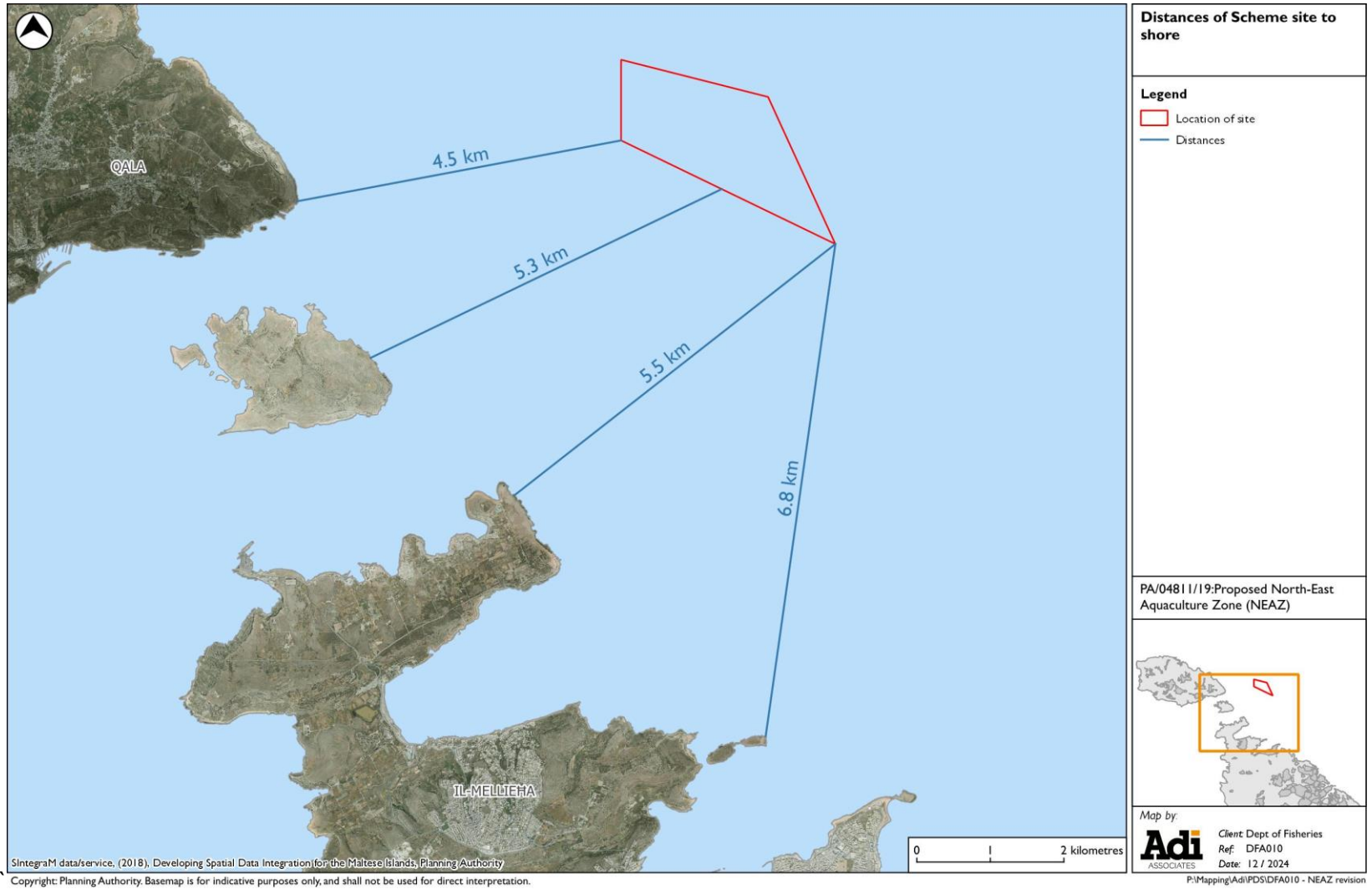
Other general maritime uses in the vicinity of the site include yachting / navigation and (in view of the presence of the tuna farms further to the southeast of the site) also recreational fishing. The location of the NEAZ as well as the individual farms / cages within the zone will have to be appropriately marked by special marker buoys and navigational aids as instructed by Transport Malta. The zone will also be charted on navigational charts.

29. The Scheme site is located around 5.1 km from the nesting sites at Rđum tal-Madonna<sup>7</sup> at its closest point and 6.5 km from the eastern Comino seabird colonies. As explained in the avifauna report for the EIA for PA/04811/19, the area in front of the nesting cliffs and up to 5 – 7 km offshore (and including the Scheme site), are often used by the nesting seabirds for rafting. The Scheme site falls within the seaward boundary of the *Puffinus yelkouan* breeding colony, but it is not within the priority area for *Calonectris diomedea* and *Hydrobates pelagicus*.

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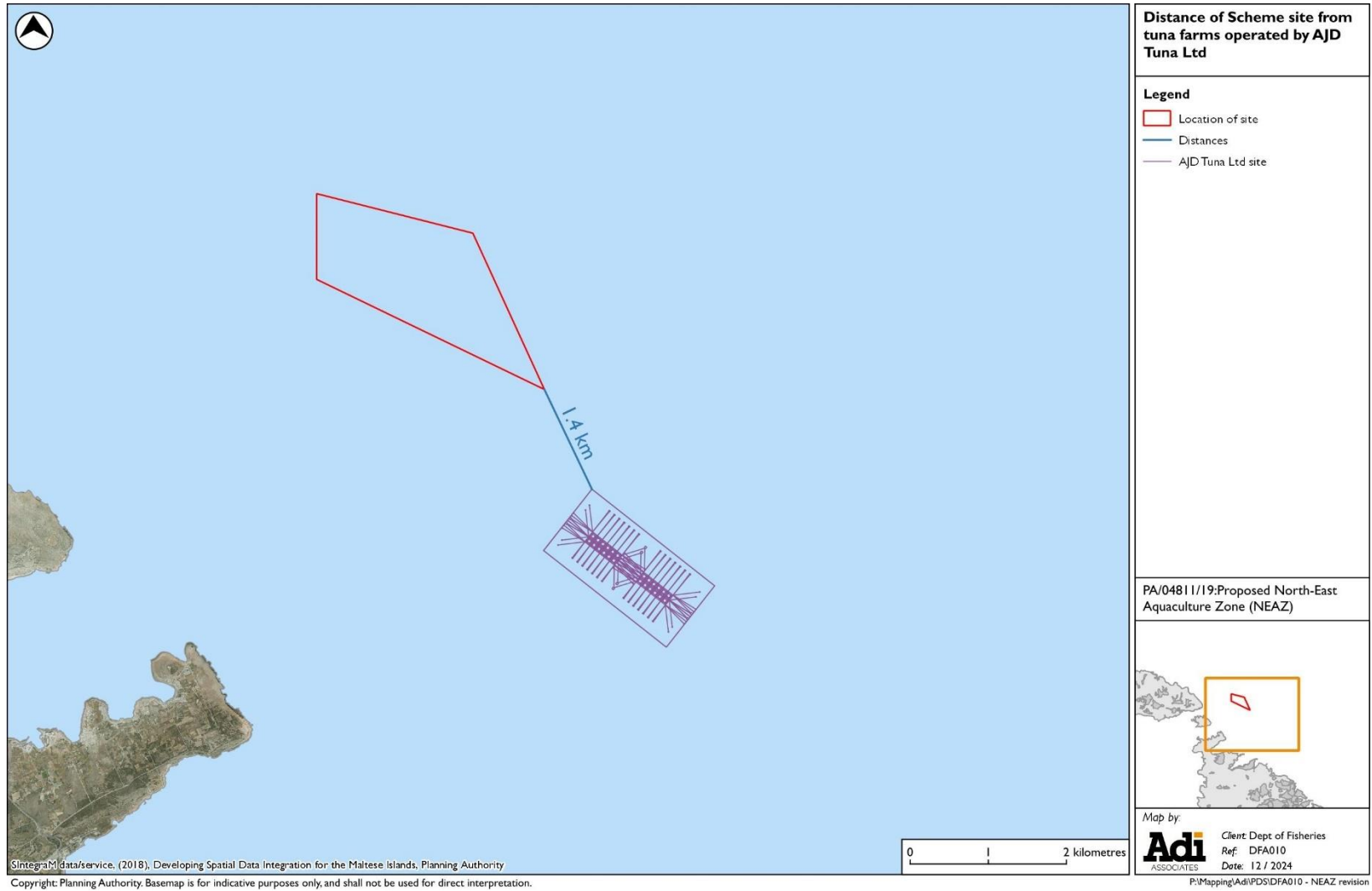
<sup>7</sup> Note that the distance is to the edge of the Scheme site as shown on the figures; the cages will likely not be located on the boundary of this site so that the effective distance will be greater.

**Figure 2: Distance of Scheme site to shore**

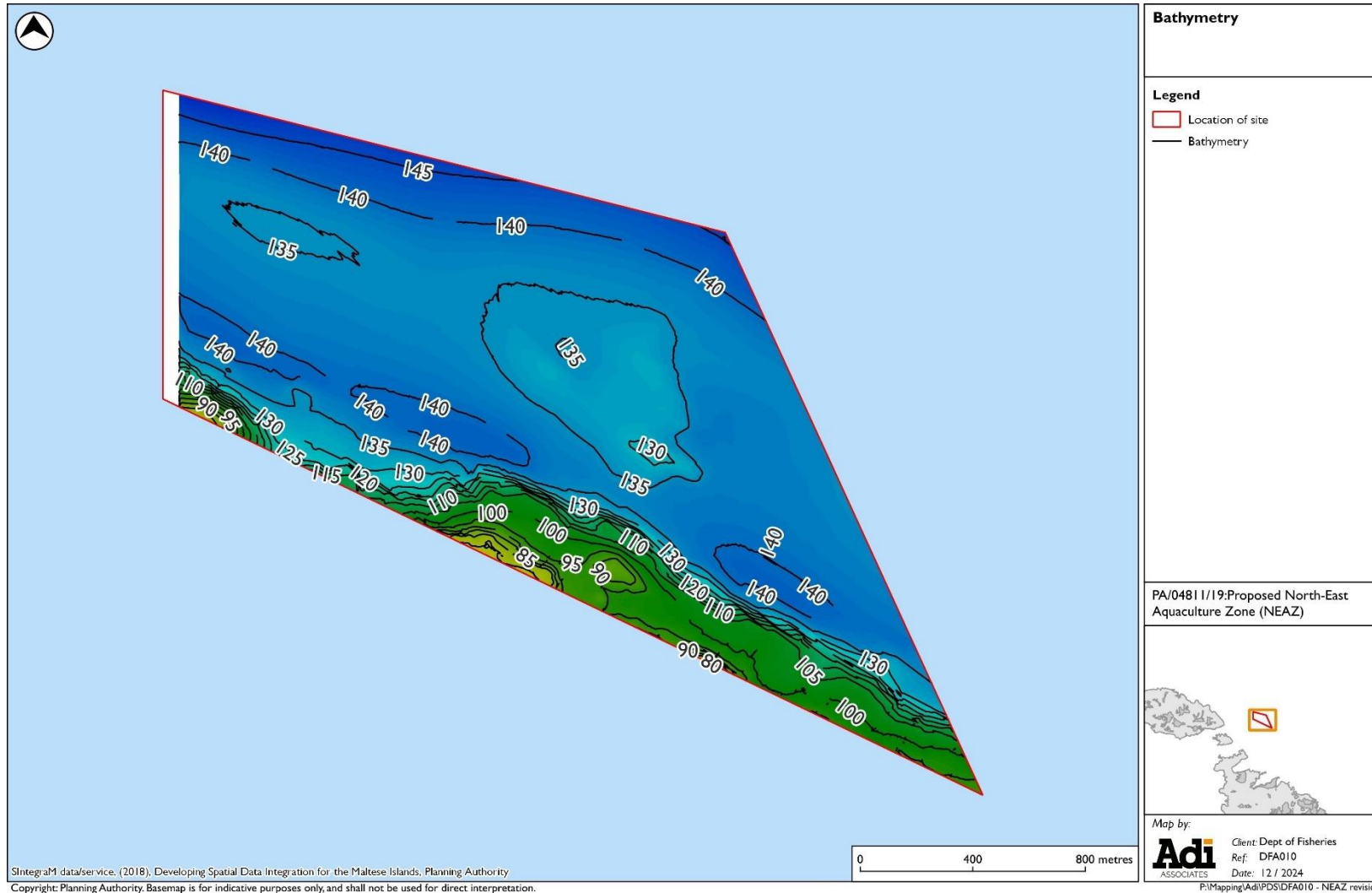




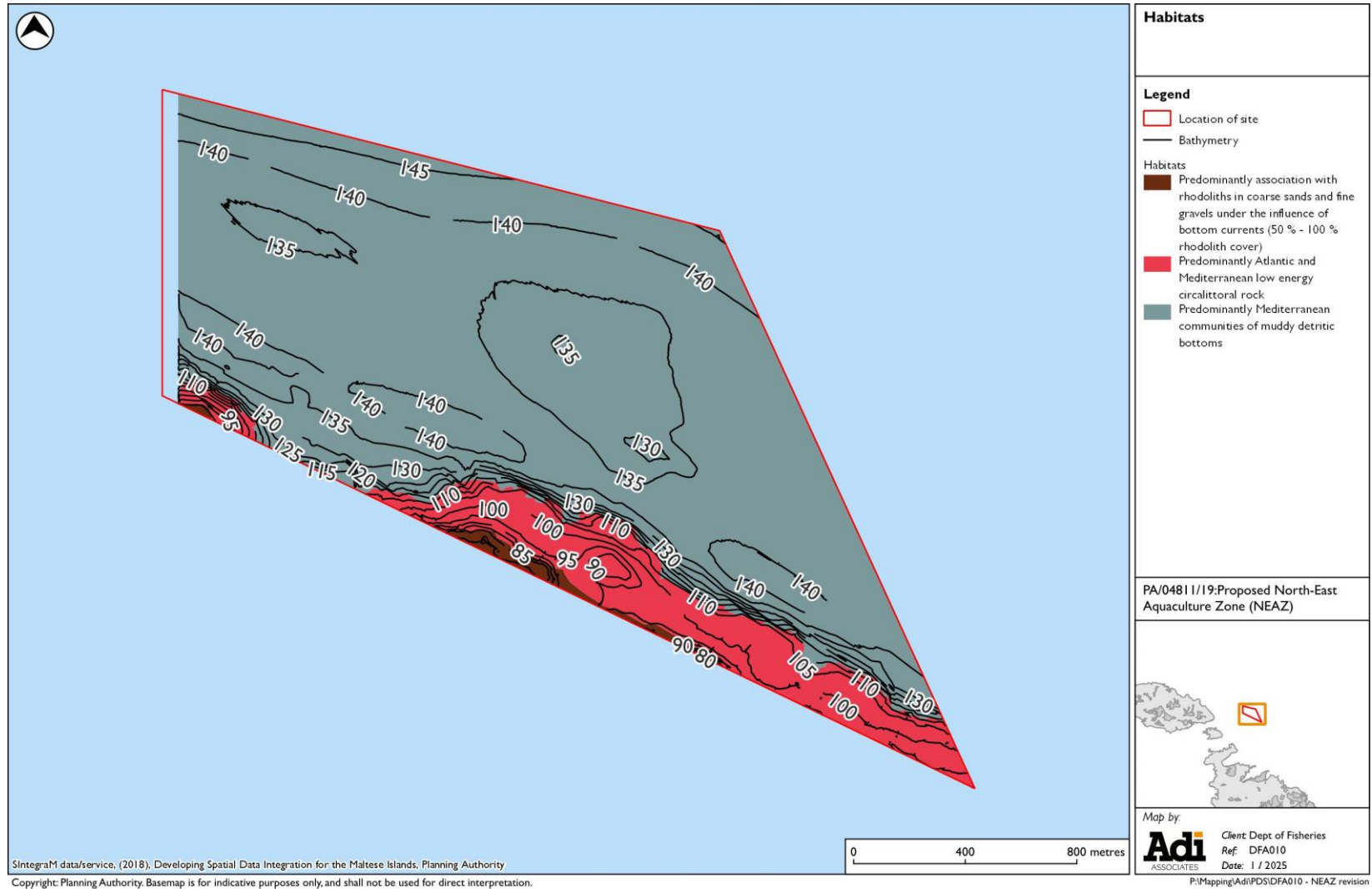
**Figure 3: Distance of Scheme site from tuna farms operated by AJD Tuna Ltd**



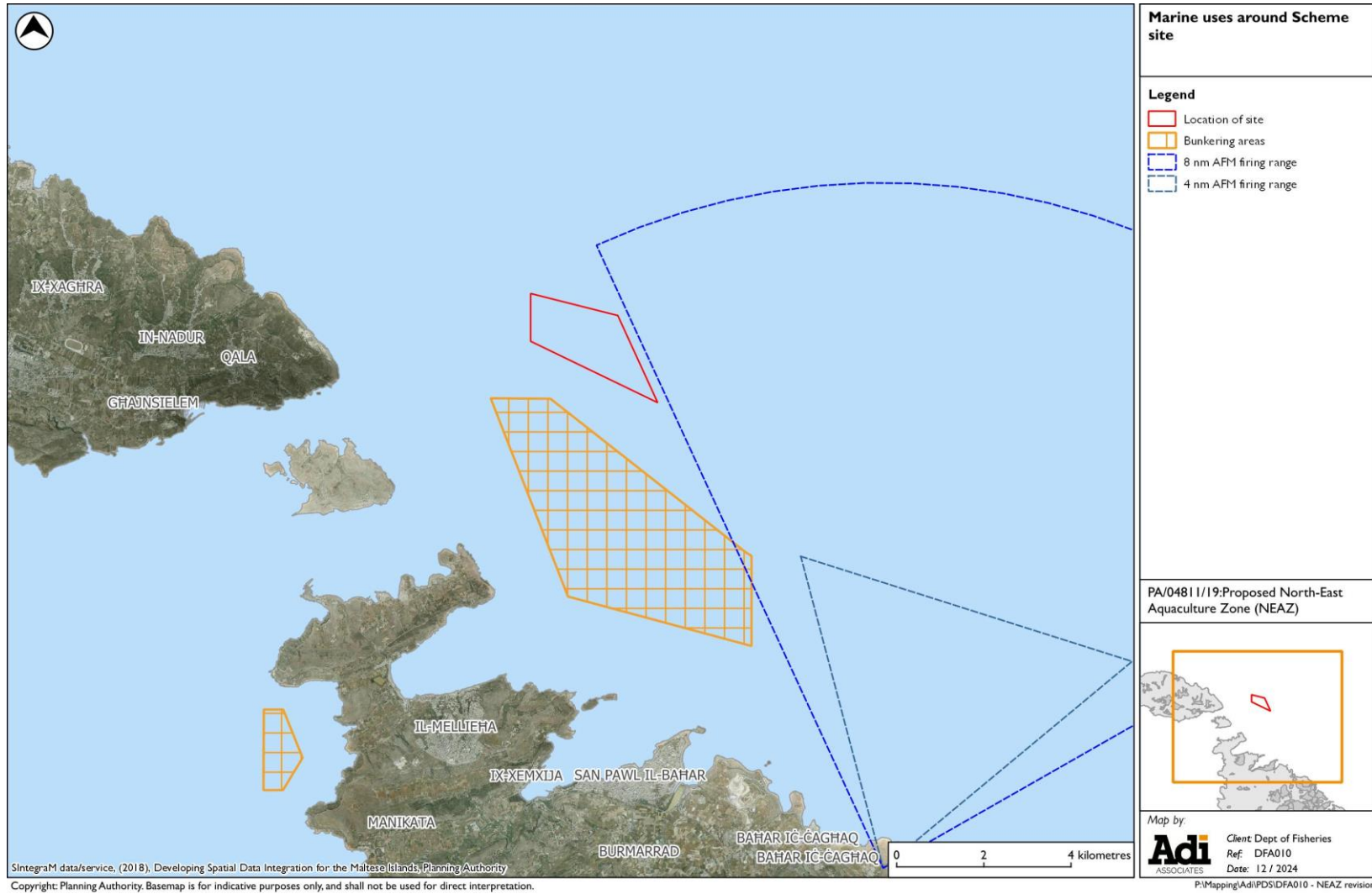
**Figure 4: Bathymetry**



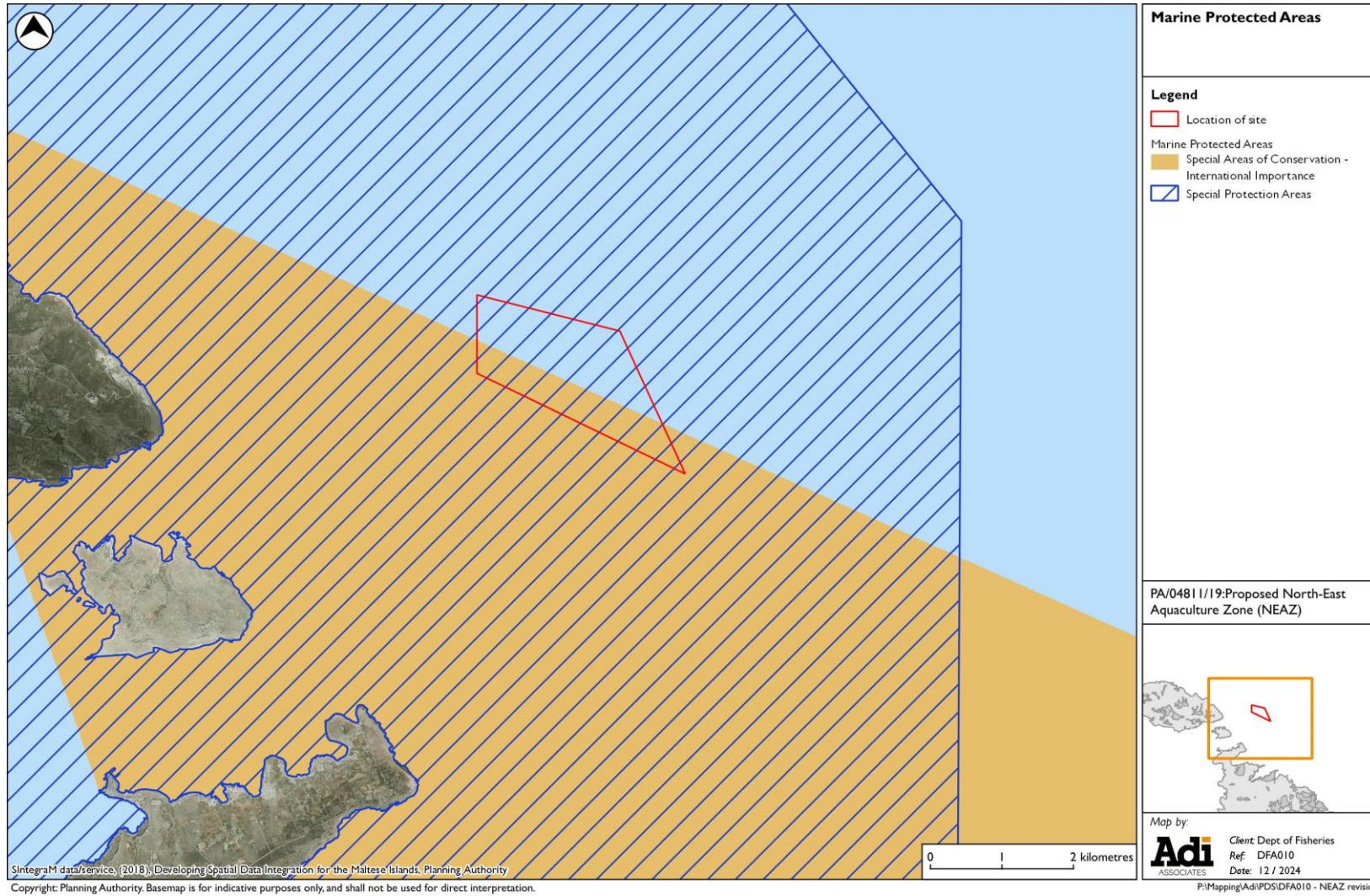
**Figure 5: Benthic habitats**



**Figure 6: Marine uses around Scheme site**



**Figure 7: Marine Protected Areas**



## THE SCHEME

30. The Scheme centres on the establishment of a general allocated zone for aquaculture, herein referred to as the Northeast Aquaculture Zone (NEAZ). The primary objective of this project is to develop an aquaculture zone that allows potential investors to sustainably farm a wide variety of finfish species. By doing so, the DFA aspires to create a model that will serve as an example for responsible fish farming methodologies, supported by rigorous standards that prioritise ecological health, resource stewardship, and social responsibility, ensuring that these initiatives contribute positively to the surrounding communities and ecosystems (Lombardo, F., pers. comm., 2024<sup>8</sup>).
31. The NEAZ will be administered by the DFA, with aquaculture operating licenses issued to interested fish farming companies. The DFA will likely assign production targets to the NEAZ, but this would need to be flexible to allow investors the possibility of focusing on one or more species depending on market conditions, economic viability or individual business strategies.

### Production capacity

32. Assuming the same sea area considered in application PA/04811/19<sup>9</sup>, that is, 4.5 km<sup>2</sup>, the maximum production capacity for smaller finfish species (i.e., excluding bluefin tuna) would be 40,000 tonnes of fish. This would allow the DFA to maximize the NEAZ's production potential while being flexible with the species to be farmed.
33. The stated tonnage would then be allotted among the different farm operators depending on the size of the farm and the species being farmed. By way of example, a typical production density for seabream is in the range of 10 - 20 kg / m<sup>3</sup>.

### Potential farmed species

34. At this stage of the proposal, the only certainty is that the NEAZ will not be used to house bluefin tuna. All other farmable species, however, can be considered. The exposed nature and the water depths at the Scheme site are challenging and therefore the species that are currently being considered<sup>10</sup> as potential farm species for this zone are the following:
- Sea Bream (*Sparus aurata*);
  - Sea Bass (*Dicentrarchus labrax*);

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<sup>8</sup> Email communication from Francesco Lombardo on behalf of the Department of Fisheries and Aquaculture; December 2024)

<sup>9</sup> It is to be noted, however, that the Scheme site has the potential to be extended towards the Northwest and to the North, as long as it remains outside of the LM-DI firing arc of the Armed Forces of Malta.

<sup>10</sup> While this list represents the species currently considered as potential farming species, this list may be added to or changed in future as other species with potential for cultivation at the proposed aquaculture zone are identified, including on the basis of market demand and/or investor purposes and preferences.

- White Grouper (*Epinephelus aeneus*);
  - Pink Dentex (*Dentex gibbosus*);
  - Red Porgy (*Pagrus pagrus*);
  - Blue-spotted Sea Bream (*Pagrus caeruleostictus*);
  - Common Dentex (*Dentex dentex*);
  - Greater Amberjack (*Seriola dumerili*);
  - Longfin Yellowtail (*Serila rivoliana*);
  - Blue Runner (*Caranx crysos*); and
  - Meagre (*Agryosomus regius*).
35. All the above species are present in Maltese waters and hence do not present any issues connected with alien species invasiveness.

### **Fingerlings**

36. The fingerlings are typically sourced from reputable hatcheries that supply fry or fingerlings for on-growing purposes. Depending on the species, the fingerlings or fry would require specific conditions for their initial growth until they reach a suitable site for offshore on-growing.

### **Stocking density**

37. The stocking density in the on-growing cages will need to follow appropriate guidelines specific to the species being reared to reduce stress and risk of disease. The fish would need to be regularly monitored to identify any early signs of disease or stress. The farm would need to implement a biosecurity plan to prevent disease outbreaks and work with veterinarians or aquaculture specialists for disease diagnostics and treatment.

### **Cages**

38. The cages to be used on the farm will depend on the investors' choices but will likely be smaller than the cages used for tuna penning. The cages that are most likely to be used are the following (see also **Figure 8**):
- Floating cages.
    - These are the most common form of aquaculture cage system. They consist of mesh nets suspended in the water from a float at the surface and anchored to the seabed. They are typically circular or square in shape and allow fish to swim freely near the surface. Floating cages are used for a variety of fish species that grow well in open water conditions.
  - Submersible cages.
    - These are designed to be submerged in deeper water, mitigating issues with surface currents and ensuring optimal conditions for fish growth.

They provide good protection against predators and harsh surface conditions. These cages are suitable for larger species like Greater Amberjack and White Grouper, which might prefer deeper waters.

- Semi-submersible cages.
  - These offer a hybrid approach, where the main buoyancy and most of the cage are submerged.

### **Mooring**

39. The mooring system for a fish farm consists of anchor, anchor chains, ropes and buoys, together with several mooring components like shackles, connection plates, chain connection links, etc. These elements need to be designed for the specific conditions obtaining at the site (depth, seabed type, current forces, etc), assembled as a complete system, correctly specified and installed, physically and operationally compatible with each other, and effective in use and maintenance. The function of the mooring system is to keep the farm in a fixed position and to avoid transfer of excessive forces to the cages, especially vertical forces. Different methods are used for mooring depending on the type of cage, how exposed the sites are to the weather, and the requirement for position exactness. The most common mooring strategy is to use a submerged grid system, with anchor lines arranged in a catenary shape to secure a group of net pens on a site (see **Figure 9**). The components of the anchor line, chain, rope and buoy, are designed specifically for the site to optimize the stiffness and elasticity characteristics required for the site conditions (Waysail, 2024<sup>11</sup>).

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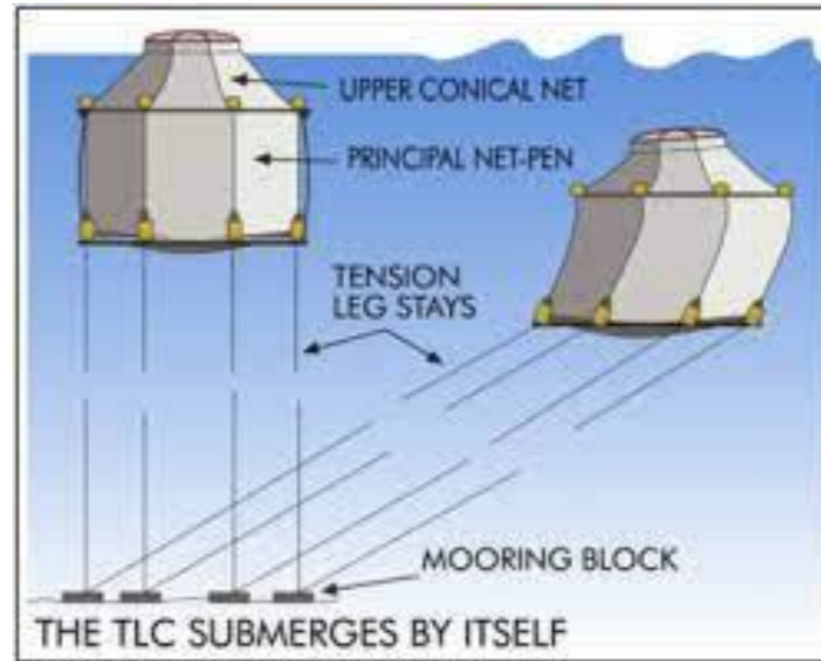
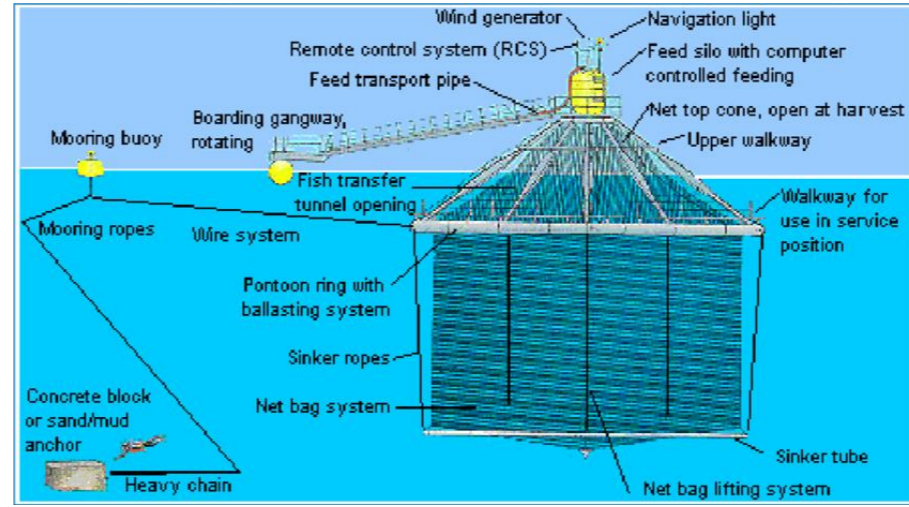
<sup>11</sup> Qinqdao Waysail Ocean Technology Co. Ltd, 2024. <https://www.qdwaysail.com/> (last accessed, 13 December 2024)



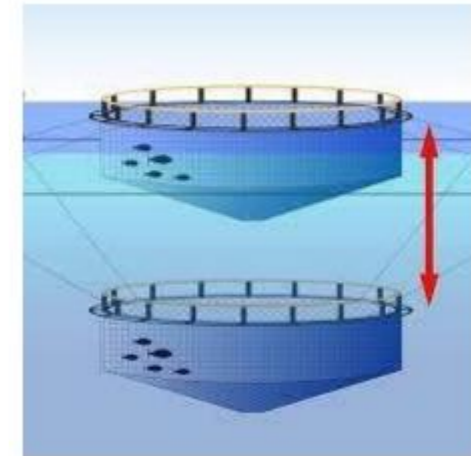
Figure 8: Cage types



Floating

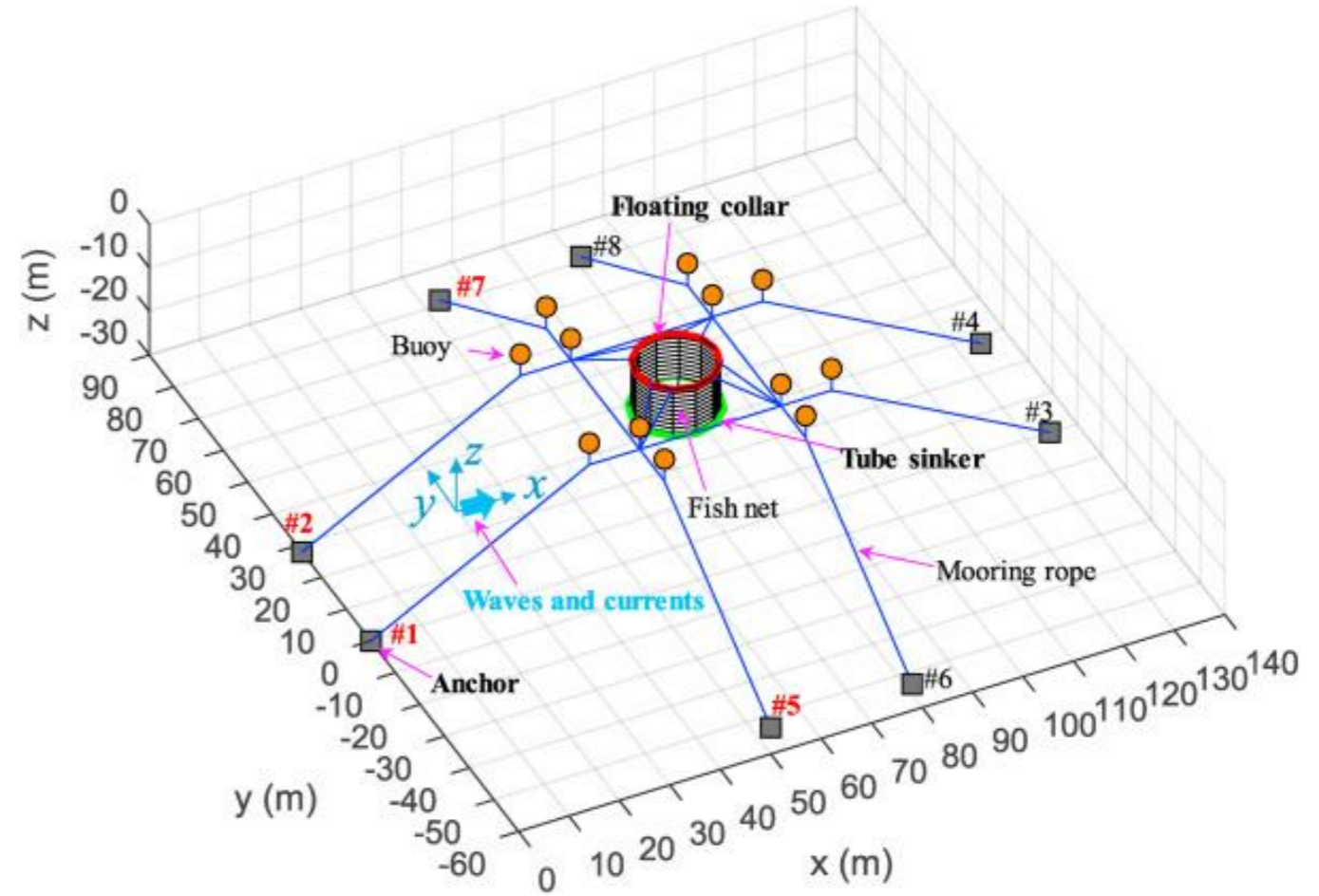
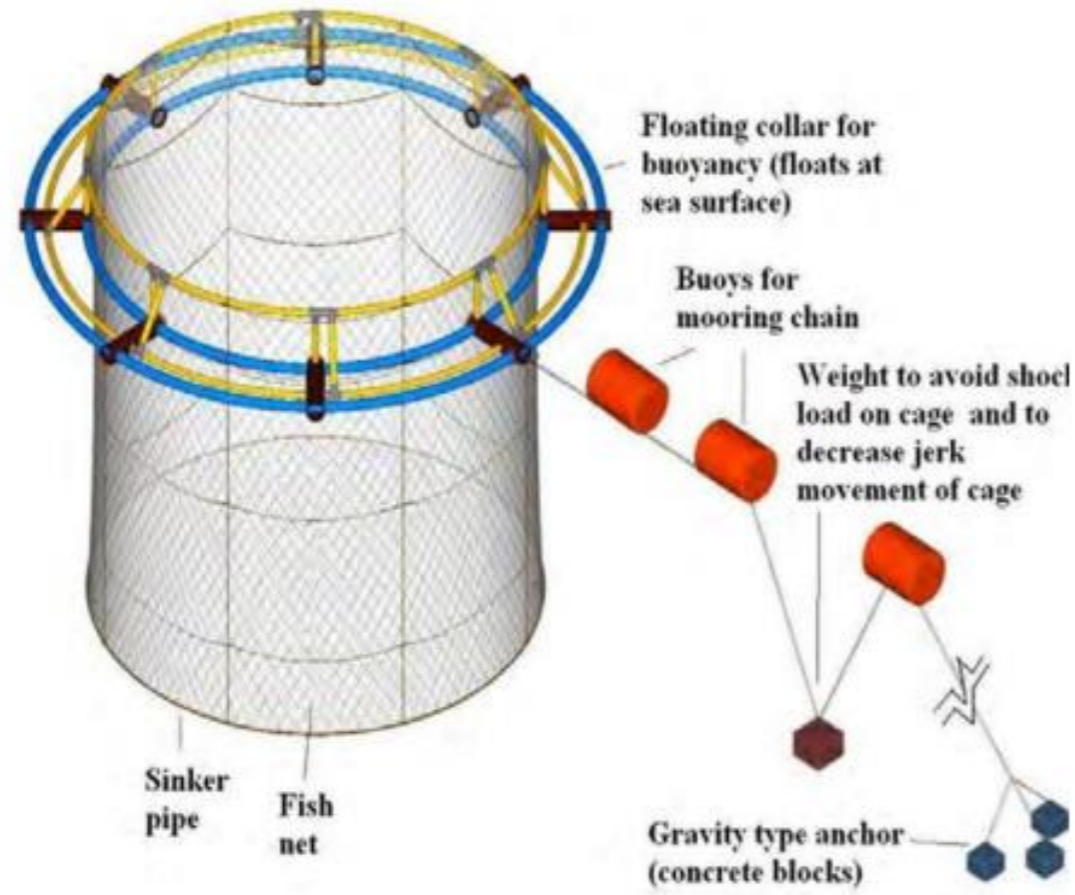


Semi-submersible



Submersible

Figure 9: Mooring layouts



## **Feed**

40. The feeding strategies for these species primarily emphasize high-protein and fat diets, often supplemented with vitamins and minerals to enhance growth and health. Unlike tuna penning, which utilises frozen baitfish, closed cycle system fish farming utilises commercial pelleted feed, which can be specifically formulated to meet species-specific nutritional needs. Some species might need supplementation with frozen feed (e.g., fish, squid).
41. Feed is designed by fish nutritionists who to account of about 40 essential nutrients needed by eth fish. These include vitamins, minerals, amino acids, and fats.
42. Fish pellets come in different sizes for application to different sized fish. There are nursery feeds and grow out diets suitable for a wide range of fish jaws. Pellets can also be floating or sinking. There is no difference in the type of pellets as regards their feed value. The pellets float or sink depending on the level of pressurization they are subjected to, make them denser (sinking) or expanded (floating). However, typically, around 10% of floating pellets tend to sink.
43. Pellets are typically imported in bags and fed into the cages via feed spreaders or pumps.
44. Feed management would need to follow a feeding programme based on the nutritional needs of the fish, using high-quality feed and adjusting the feeding rates according to the growth of the fish and their life stage.

## **Use of Antibiotics**

45. The use of antibiotics in aquaculture is usually regulated and should be done on an as-needed basis. Common antibiotics may include oxytetracycline, amoxicillin and florfenicol, which are typically prescribed for bacterial infections. However, their use should be minimal and under veterinary guidance to avoid antibiotic resistance. Feed supplements might include vitamins A, D, E, C, and B-complex vitamins to enhance fish health and their resistance to diseases. Additionally, probiotics and prebiotics are sometimes incorporated into feeds to improve gut health and enhance immune responses in the fish. Chemotherapeutics for the treatment of parasites and other diseases can include formaldehyde and praziquantel, but these should be used according to guidelines to mitigate environmental impact.

## **Operational procedures**

46. Once a farm is operational, it will need to follow strict procedures to ensure a viable operation. The day-to-day operations will involve measures aimed at ensuring a health stock of fish. This will include various inputs, such as:
  - Water Management (to monitor and manage water quality parameters);
  - Feeding Management;
  - Health Management;

- Record Keeping (including stocking numbers, feeding schedules, growth rates, water quality, and health treatments);
- Harvesting schedule;
- Waste Management Plan;
- Regulatory Compliance;
- Sustainability Practices;
- Market and Business Planning; and
- Training and Education.

## **SCHEME CONSTRUCTION**

47. The establishment of a farm will require the deployment of anchors, shackles and buoys, and the fixing of the floating collars and nets or other cage paraphernalia (depending on the type of cage opted for). The farm will also need to deploy special marker buoys and other navigational aids, as directed by the Harbour Master.
48. The type of anchors to be used will depend on the site conditions, the water depths, the type of seabed, and the size of the cages and the forces on them for prevailing sea currents. Typically, deadweight concrete mooring blocks are used on local fish farms; however, the suitability of such mooring systems for the depths and the type of seabed at the Scheme site might need to be ascertained. Other anchoring systems, utilising anchors instead of mooring blocks may need to be employed. One example would be the Stingray Mooring Anchor, which provides very good holding powers, commonly used in marine mooring, offshore aquaculture fish cage mooring, seaweed or oyster mooring projects especially for sandy, mud or silty seabeds.

## **WASTE MANAGEMENT**

49. Effective waste management in marine fish farms is critical to minimizing environmental impacts and promoting sustainable aquaculture practices. Ongoing research, technological advancements, regulatory compliance, and the adoption of best management practices play a significant role in enhancing waste management strategies within this sector.
50. All aquaculture operations are subject to the Waste Management Regulations (S.L. 549.63) and the Waste Management (Activity Registration) Regulations (S.L. 549.45). Waste management is also an integral aspect of the environmental permit that each farm needs to obtain. Farms will also need to provide a waste management plan as part of their operational permit issued by the DFA.
51. Waste generated at the NEAZ will largely depend on the type of fish being farmed and the procedures undertaken at the site or at supporting land bases. Wastes generated at the Scheme site are expected to include:
  - Carton boxes and plastic bags (packaging waste from the feed);

- Uneaten feed;
- Fish excreta;
- Dead fish;
- Algal and other net fouling marine growth;
- Antibiotics and other medicines; and
- Other operational wastes.

Carton boxes and plastic sheeting

52. This waste stream is generated as a result of the importation of the feed. The feed is typically imported in bags and occasionally in boxes. These are collected and managed through the packaging waste stream on land via registered waste carriers.

Uneaten feed

53. As mentioned, feeding will be managed through a specific feed management programme. The use of floating pellets aids the reduction of feed loss through uneaten feed; however, as mentioned, around 10% of floating pellets tend to sink. Unless these are eaten before they settle on the bottom, they would be lost from the cages and end on the seabed, where they could be fed upon by wild fish and other bottom dwelling detritivores. Depending on the amounts lost in unit time, these can result in overloading of the scavenging community and an accumulation of organic carbon and nitrogen in the sediment beneath the cages or in the direction of the prevailing currents. This would lead to an impoverished benthic community compared to the status quo prior to the deployment of the farms.
54. The capacity of the environment to assimilate the pollutants settling on the seabed depends largely on the amount of settlement of material and the capability of seabed bacteria and scavengers to utilise this material and / or adapt to its presence.

Fish excreta

55. Like uneaten feed, fish excreta contain or release ammonia, nitrate, and phosphate in soluble form. These nutrients can enhance the growth of marine plants and algae (including phytoplankton). Some of these nutrients are taken up by algae and net-fouling assemblages and also by benthic dwellers and scavengers.
56. The seabed may be affected by fish faeces that settle on the bottom of the sea beneath the cages. The interaction that a fish farm has with the seabed is often dependent on the currents around the farm; the greater the current the smaller the interaction with the seabed.

Dead fish

57. Death of fish in aquaculture farms is typically a result of disease. The monitoring of fish for indications of stress or disease is a very important aspect of aquaculture management.

58. Dead fish would typically float to the surface and can be removed manually, but if the fish sink, they can create additional weight on the cage bottom, especially in the event of a mass mortality episode.
59. It is important that all fish farms operating from the NEAZ be obliged to produce a mass mortality contingency plan for such events, as is the case for the tuna penning farms in the SEAZ.

Net fouling marine growth

60. Marine growth on fish cage nets is a regular occurrence. Fish nets are often treated with copper-based anti-fouling chemicals to minimize growth. Alternatively, the algal growth can be removed by divers using soft bristle brushes or pressure washers. In the case of extensive fouling, the net can be lifted partially or wholly out of the water and either air dried on the collars or removed for scraping on land. The growth that is removed on land is disposed of through the organic waste collection system.

Other operational wastes

61. Other wastes generated by the farms could include anthropogenic material such as rope, boxes, and municipal-type wastes from the service vessels that may occasionally find their way overboard. Environmental monitoring reports for fish farming operations have often reported the presence of such anthropogenic litter on the seabed.
62. It is important that fish farm operators are made aware of this problem and that they undertake to monitor their sites and to clean up the seabed should such litter be encountered. Service vessel crew and farm personnel should also be made aware of the consequences of such rubbish ending up in the sea.
63. Fish farming operations are to develop a plan for managing their waste products and consider using by-products in composting or as fertilizers in crop production.

**Employment**

64. Individual operators will employ their own staff. In general, for a fish farm producing around 1,000 tonnes of fish per year, the workforce might range between 20 and 30 individuals (full-time, part-time and casual workers), depending on the specific operational details and the technology employed on the farm. The exact employment complement for the NEAZ would depend on the number and size of farm/s deployed.

## POTENTIAL ENVIRONMENTAL IMPACTS

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65. Environmental impacts can be negative as well as positive and their assessment is important to better define the effects that a proposal may have on its receiving environment. This Project Description Statement identifies a preliminary list of the potential environmental impacts of the Scheme; the list identifies only those impacts that may be potentially significant. Significant negative impacts would typically require additional assessment through the EIA process to define the extent of the impact, potential mitigation measures, and hence the residual impact of the proposal following mitigation, which is an important consideration for the final decision on the proposal by the regulatory and permitting authorities.

- **Impacts on the benthic environment during deployment of moorings / anchors**
  - The moorings or anchors required to maintain the cages in place will have a direct impact on the area of seabed they are placed on / inserted in. While the moorings and anchors are not large, they will impact an area of seabed in a permanent way. The impact will depend mostly on the sensitivity of the seabed. As shown in **Figure 5** above, the seabed in this area consists of muddy sand.
- **Impacts on the benthic environment during operation**
  - The main impact on the benthic environment during the farming operations is from the loss of materials, the settlement of uneaten feed on the seafloor, and settlement of fish faeces. The settlement of organic matter on the seabed would typically attract benthic scavengers to the area, which could affect the natural environment of the seabed.
- **Impacts on sediments and water quality during operation**
  - The main impacts on the sediments and the water column will be from waste releases (mainly faeces from the fish), which, due to the high stocking density, could impact the quality of the water. Settling uneaten feed and fish faeces will also affect the sediment quality of the seabed. The use of antifouling chemicals on the nets and antibiotics and other chemicals to treat the fish can further affect the water quality.
- **Impacts from waste generated during operation**
  - Other waste streams from the fish farms will include carton boxes and plastic bags from the importation of feed. Each farm should have its own Waste Management Plan.
- **Risk of disease and introduction of pathogens**
  - Fish farming operations have often resulted in the escape of farmed fish during storms or from net damage. The escape of farmed fish into the wild can threaten local biodiversity, especially if non-native species are

being reared, since non-native species may outcompete or interbreed with wild fish populations. To mitigate this risk, biotechnological advancements are being used to ensure that farmed species are sterile, preventing them from reproducing if they escape into natural ecosystems. Additionally, stricter regulations and enhanced containment systems are being implemented to prevent accidental releases. The Scheme proposes to restrict the farming to local species, thereby eliminating the problem of foreign species interference.

- Disease is a fact of life in all animal populations and production systems on land and in water. In the case of offshore aquaculture operations, water moves freely between the farms and the open sea. Risks include the amplification and transmission of disease between farmed and wild fish, and the introduction of nonnative pathogens and parasites when fish are transported.
- Fish diseases occur naturally in the wild, but their effects often go unnoticed because dead fish quickly become prey. Disease events can occur in fish farms because 1) fish are reared at higher densities than nature, increasing contact between fish; 2) infected fish are not removed as promptly from the farm as they would be by natural predators; 3) farmed fish are more closely and easily observed than wild fish. Thus, pathogens that normally exist in low numbers and do not cause disease in the wild may result in disease in farmed fish (NOAA, 2024<sup>12</sup>).
- Many farmed fish are vaccinated against diseases that have caused problems in the past. Antibiotics are rarely used and, if required, their use is strictly regulated and always administered under the supervision of a veterinarian.

- **Impacts on seabird populations**

- Fish farms are an attractor to seabirds due to the presence of the fish. Local farms already attract significant numbers of seabirds, including gulls, terns, shearwaters, and petrels waste. Birds can be kept away from floating cages through the deployment of bird nets across the surface of the cages. Farms should keep a record of bird presence on the farm.

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<sup>12</sup> NOAA Fisheries, 2024. Marine Aquaculture and the Environment. (<https://www.fisheries.noaa.gov/>; last accessed, 13 December 2024)