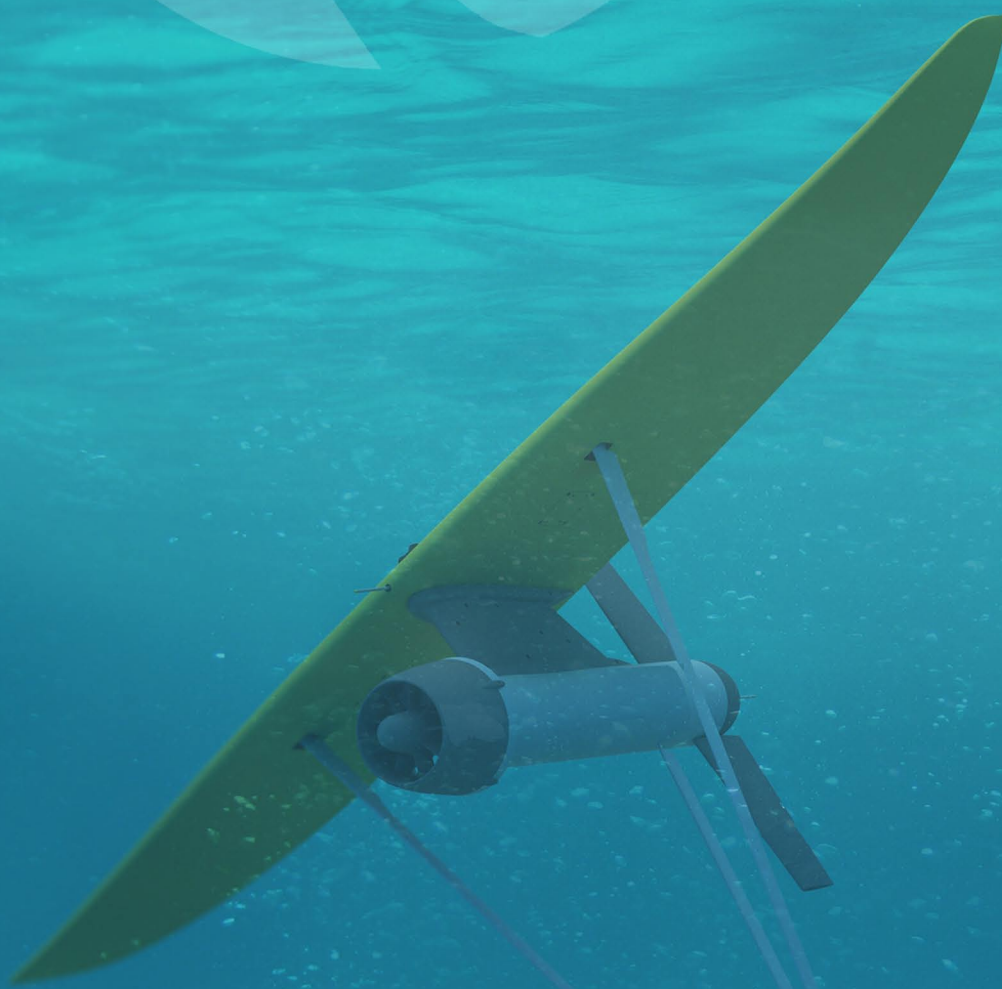


Deep Green Holyhead Deep Project Phase I (0.5 MW) Non-technical Summary

June 2016



 **Minesto**

Non-Technical Summary

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1 INTRODUCTION

This document is a Non-Technical Summary of the Environmental Statement (ES) for the proposed Minesto DG Holyhead Deep Project ('the Project'). The purpose of the document is to provide an overview of the key findings of the Environmental Impact Assessment (EIA) undertaken by the independent energy consultancy Xodus Group. Whilst it is a summary of the main ES, it has been written as a stand-alone document and has been made available as such.

1.1 Need for the Project

There are four key drivers of the shift in energy production toward low carbon sources, including renewable energy, in the UK and Wales:

- > The need to address climate change;
- > The need to secure energy supply;
- > The need for new energy infrastructure; and
- > The need to maximise economic opportunities.

The Welsh Government has demonstrated its commitment to the needs outlined above in a document entitled: 'Energy Wales: A Low Carbon Transition', in which it states: "Our aim is that by 2025 up to twice as much renewable electricity is generated annually in Wales as today. By 2050 our aim is that almost all our local energy needs are met by low carbon electricity production." For context, 10.1% of energy in Wales in 2013 came from renewable sources.

The UK has committed to sourcing 15% of its total energy needs from renewable sources by 2020, and recent projections suggest that up to 30% of our electricity could come from renewable sources, compared to 6.7% in 2009. The UK and Welsh Governments have also made legally binding commitments to cut greenhouse gas emissions by 80% by 2050.

Projects such as the DG Holyhead Deep Project are important in developing the renewables industry in Wales and shifting energy generation away from non-renewable sources.

1.2 Minesto AB

Minesto AB (Minesto) is a marine energy technology company founded in 2007 whose majority owners are BGA Invest and Midroc New Technology. Minesto's headquarters are in Gothenburg, Sweden, and the company also has offices in Portaferry on the edge of Strangford Lough, Northern Ireland, and in Anglesey, North Wales.

Minesto has developed a unique, award winning technology for cost efficient electricity generation from tidal and ocean currents, known as Deep Green. The full scale tidal power plant, known as a Deep Green Utility (DGU) unit, resembles an underwater kite made up of a wing with a small turbine attached to its underside, tethered to a foundation fixed to the seabed (see Figure 1.1). The technology takes advantage of hydrodynamic lift created by the wing as water current flow moves past the device. In doing so, the device is able to move at speeds far greater than velocity of the current, whilst being steered in a figure-of-eight, which allows Deep Green to be deployed in areas of lower current velocity compared to other tidal energy technologies.

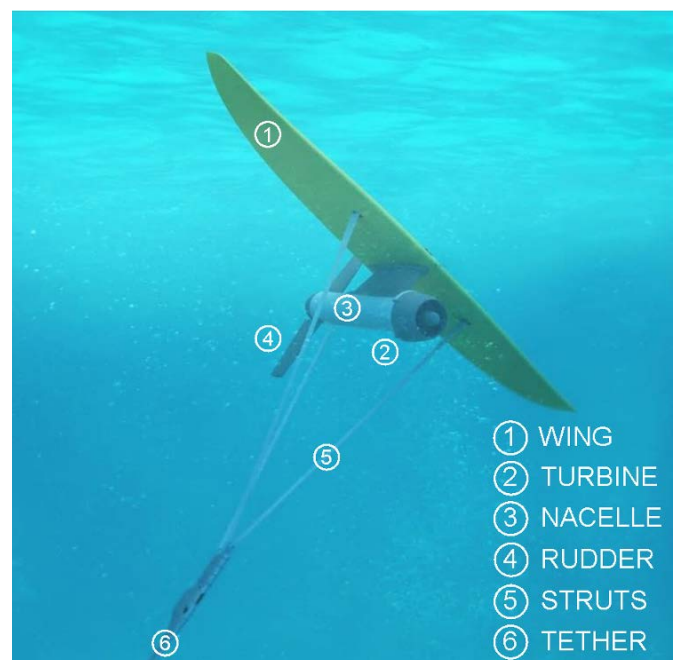


Figure 1.1 DGU unit

The viability of the Deep Green concept has been successfully demonstrated at a long-term testing facility located in Strangford Lough, Ireland, where testing and electricity generation with a 1:4 scale device has been underway since 2013. The purpose of the present Project is to demonstrate the first full-scale installation of the device, ahead of a future array of devices.

In June 2014 Minesto was awarded an Agreement for Lease (AfL) by The Crown Estate (TCE), for up to a 10 MW Commercial Demonstration installation in the Holyhead Deep, an area of deep water located approximately 6.5 km west of Holy Island, Anglesey (see Figure 1.2). The Project will comprise a single DGU unit, seabed foundation and a surface moored barge or similar such surface platform, such as a moored vessel or self-contained buoy. Electricity generated by the DGU unit will be transported via an umbilical to a remote electricity meter¹ located on the barge. The potential future array including export cable and grid connection onshore, will be captured under a separate application and will have its own dedicated EIA, and has therefore only been considered in terms of potential cumulative impact in the current EIA.

The principal purpose of this Project is to deploy, monitor and optimise a single full scale device ahead of a larger project comprising an array of devices. As such, the maximum operational period for the single 0.5 MW device covered by this application will be five years, following installation of the DGU at some point during Q2/3 2017. At the end of this period, the single device will either be decommissioned or incorporated into the larger scheme, subject to the relevant permissions.

Due to the close proximity of the Minesto DG Holyhead Deep Project to the West Anglesey Demonstration Zone (WADZ), Minesto is collaborating with Morlais Marine Energy (Morlais), the manager of the WADZ project, to jointly develop grid and cable infrastructure for the future proposed array, which will help reduce costs and minimise the combined environmental footprint of the two projects.

1.3 Regulatory consent

A Marine Licence under the Marine and Coastal Access Act 2009 (the Marine Act) is required for the construction and operation of the Project. To support the Marine Licence application, Minesto has been required to produce an ES under the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended), in order to determine whether there is potential for the Project to have any adverse effects on the environment. The ES includes consideration of navigational issues via a Navigational Risk Assessment (NRA).

In addition to the above, information to support the Habitats Regulations Appraisal (HRA) process has been provided in order to inform the potential impacts on conservation sites of European importance (including possible future sites that have recently gone out to consultation) and assist in determining whether an Appropriate Assessment is required. The HRA process is separate to the EIA process, although information collated during the EIA is used to inform the HRA.

¹ A self-contained electrical system designed to allow the DGU to operate remotely without a grid connection. The system will provide a means of dissipating the energy generated by the DGU, in addition to monitoring and characterising the energy output of the device.

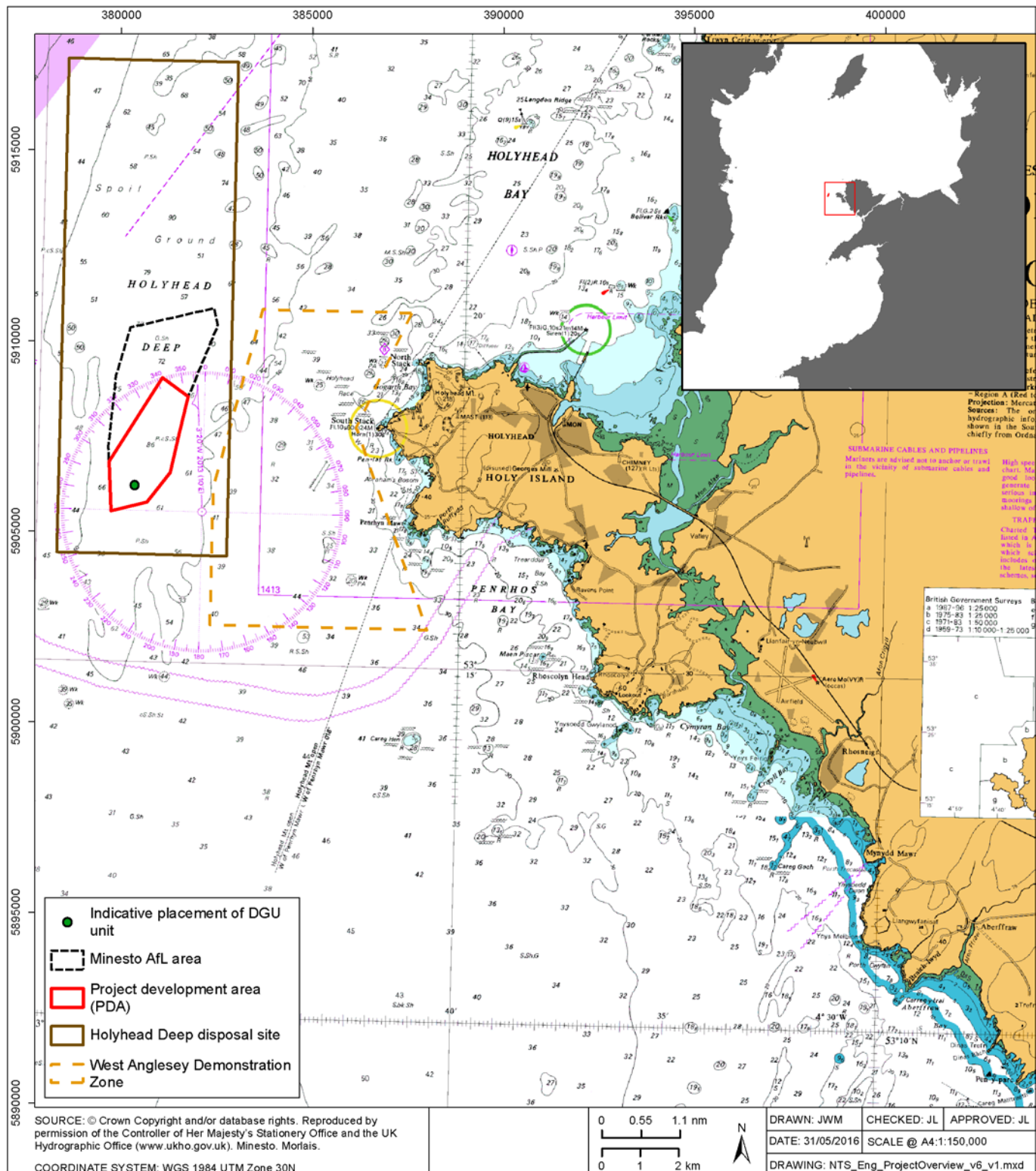


Figure 1.2 Location of the Minesto DG Holyhead Deep Project

2 PROJECT DETAILS

2.1 Overview

The proposed Project will be located approximately 6.5 km off the coast of Holy Island, Anglesey. The Project includes construction, installation, commissioning, operation and maintenance, and decommissioning activities. It will involve the installation of a single 0.5 MW DGU unit, its foundation and associated surface moored barge (or similar such surface platform) with an electricity meter. The DGU will be deployed within a specific subsection of the Area for Lease (Afl) area, referred to as the Project Development Area (PDA). An indicative example location of the DGU is provided in Figure 2.1. The DGU is likely to be installed in the south of the PDA and will be attached to one of four foundation options: a concrete gravity base structure, a monopile, a tripod structure, or a mud mat foundation. During the Project, a barge (or similar) will be present on site to monitor, calibrate and optimise the DGU.

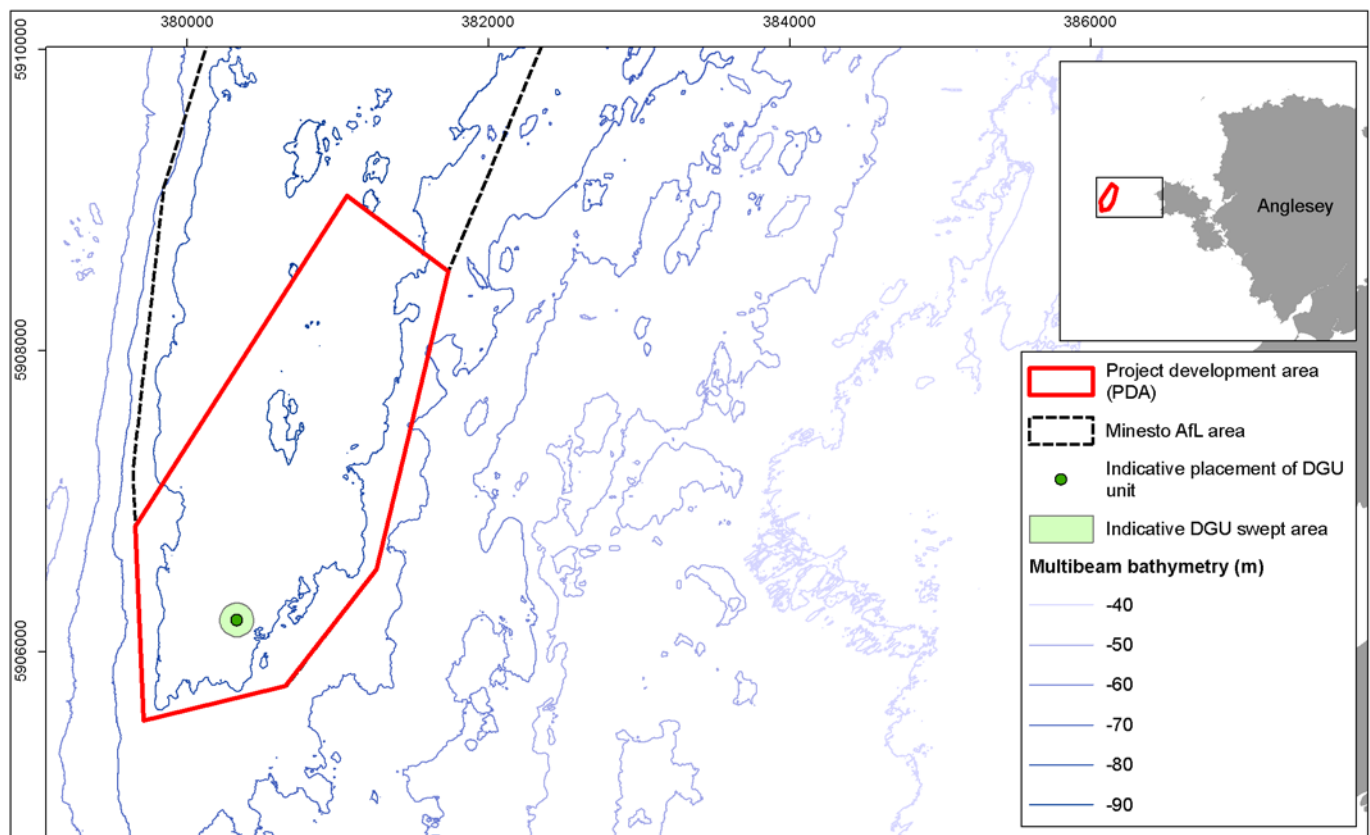


Figure 2.1 Indicative Project layout

2.2 Operating principle

Figure 2.2 illustrates the operating principle of the Deep Green technology. As water current flow crosses the DGU's wing it generates lift, moving the device forwards. As it 'flies' in the water column, the rudder automatically steers it in a figure-of-eight. The DGU will generally operate between 20 m and 60 m below the sea surface, sweeping an approximate width of 100 to 140 m. A buoyancy control device located inside the wing will ensure that the unit never gets closer than 12.5 m from the sea surface unless instructed to do so. A built in failsafe system will ensure that the DGU hovers mid-water in the event of any malfunction, as well as during slack water, as shown in Figure 2.3. During normal operation mode the DGU will be tethered to the foundation structure on the seabed, however, it is also possible for it to operate in 'upside-down mode', whereby the tether is attached to the bottom of the barge on the sea surface, as shown in Figure 2.4. This allows for rapid retrieval of the DGU unit, facilitating calibration and optimisation during testing.

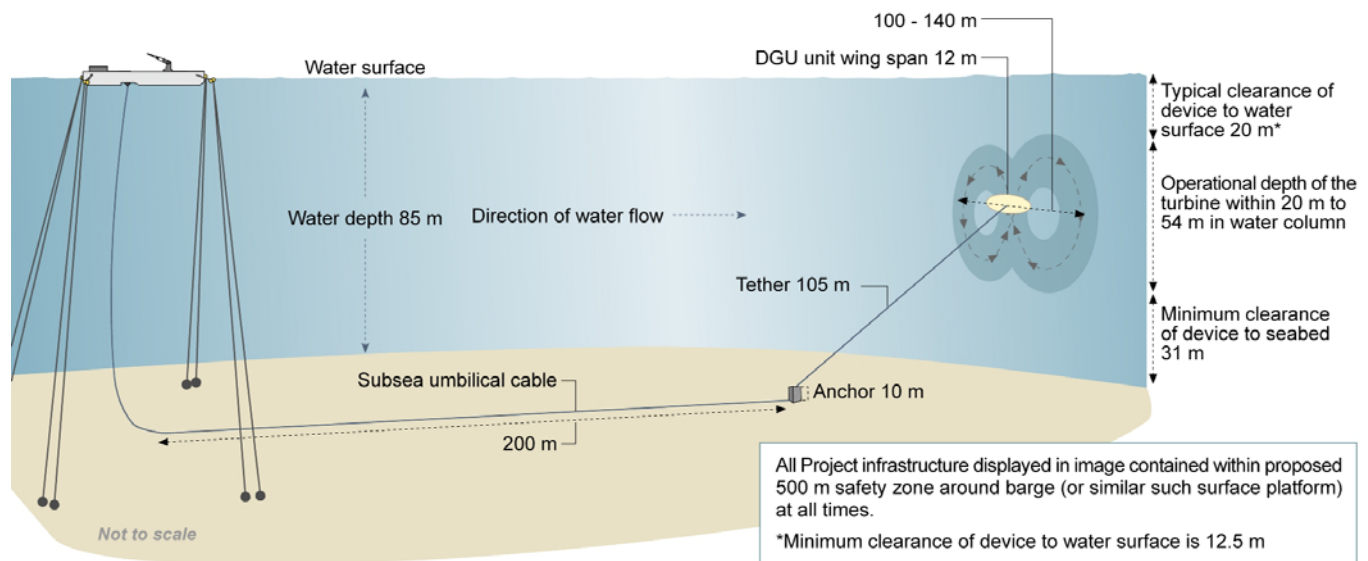


Figure 2.2 DGU unit in normal operation (fixed to the seabed)

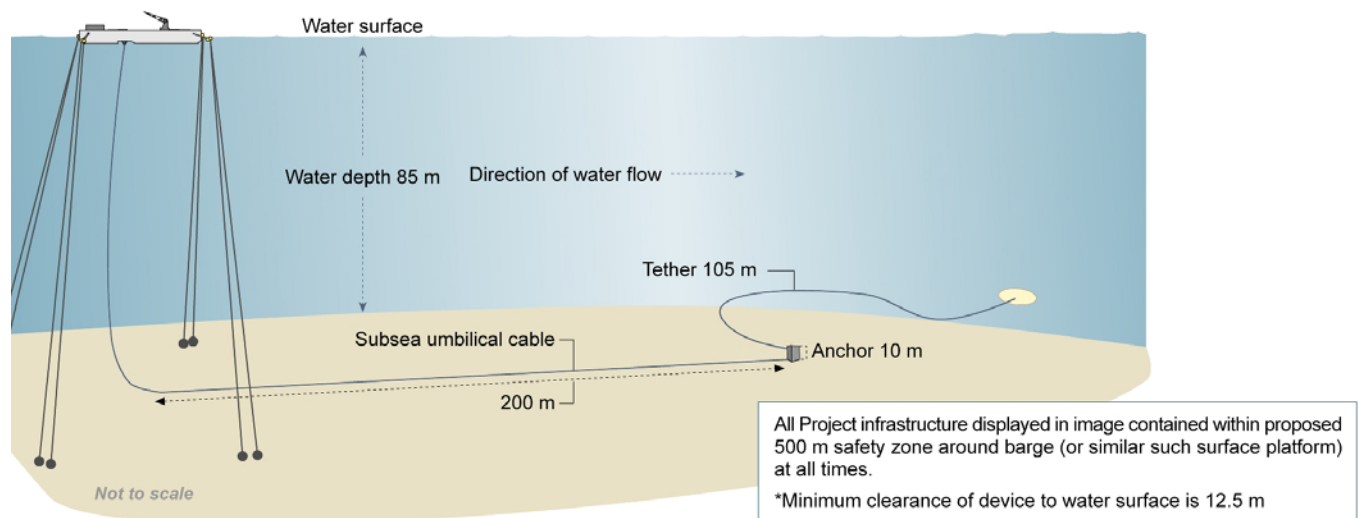


Figure 2.3 DGU hovering in mid-water during slack water or in failsafe mode

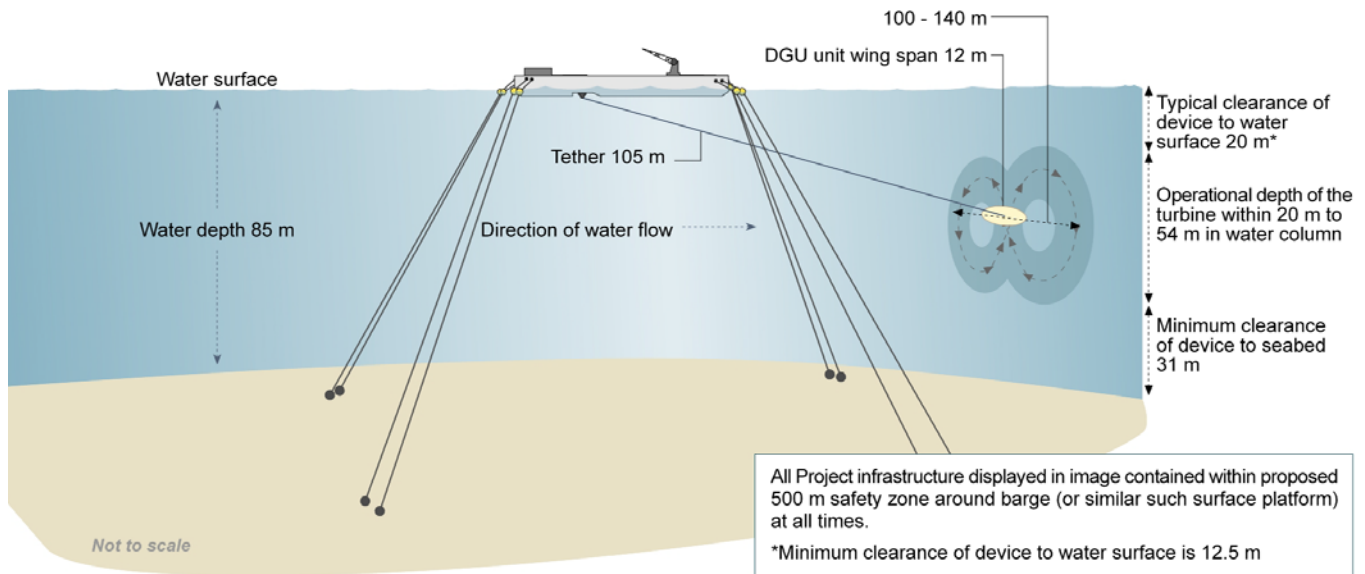


Figure 2.4 DGU unit in upside-down mode (fixed to the underside of a barge)

2.3 Site selection and alternatives

The Deep Green technology has been demonstrated through successful deployments of 1:10 and 1:4 scale prototypes in Strangford Lough, Northern Ireland. The DG Holyhead Deep Project was born out of the need to deploy, test and operate a full scale device at a site that could also potentially accommodate a future array.

The Minesto site development team conducted an in-depth option analysis of low flow velocity sites around the world, following the European Marine Energy Centre (EMEC) standards for site evaluation² (EMEC, 2009). The UK was identified as the most suitable location on the basis that its territorial waters contain approximately half of the European tidal resource and around 10-15% of the known global resource. Numerous locations around the UK were considered, but Wales was selected as the preferred option due to the highly suitable environmental conditions and government commitment to marine renewable energy, which creates a positive business climate and offers significant opportunities to attract support and investment into this project.

Following the decision to investigate deployment in Wales, Minesto commenced with the evaluation of different sites on the Welsh coast. Identification of a suitable location for development of the Project was influenced by a number of factors, including:

- > Tidal velocity – the Deep Green technology requires tidal velocities within the range of 0.5 to 2.2 m/s;
- > Water depths – the most suitable water depth for the Deep Green is 50 to 120 m;
- > Wave height – ideally significant wave heights should be less than 4 m; and
- > Proximity to shore – to facilitate installation, commissioning and maintenance activities and minimise cabling costs associated with potential future grid connection.

The broad areas considered included north-west Anglesey, south-west Wales and the Llŷn peninsula. Minesto concluded that the Holyhead Deep off the coast of north-west Anglesey was the preferred area for the following reasons:

² EMEC (2009). European Marine Energy Centre (EMEC) Assessment of Tidal Energy Resource – Marine Renewable Energy Guides. The European Marine Energy Centre Ltd. 2009.

- > The site has the most favourable tidal velocities for the DGU device, so would potentially yield the most electricity - tidal velocities fall within the operational range (0.5 to 2.2 m/s) for energy generation more than 75% of the time, and are within the optimal range (1.0 to 2.2 m/s) for the Deep Green technology for almost 50% of the time;
- > The large depression in the seabed, after which the Holyhead Deep is named, provides suitable depths of between 50 m and 100 m, and yet, is only 6.5 km from shore, thus minimising future cabling costs (when grid connection is required) in comparison to other areas with similar depths;
- > There is a sufficiently large area of suitable seabed to accommodate potential future expansion;
- > The Holyhead Deep is also close to several viable grid connection points (required for the planned expansion) on Holy Island and Anglesey, and a major port and harbour (Holyhead), which can be used for manufacture, launch and maintenance; and
- > There is significant interest from tidal energy projects in the area west of Anglesey, which has the potential to provide opportunities for tidal job cluster creation, area knowledge build up and cost savings through shared works.

Following this decision Minesto submitted an application for an Agreement for Lease (AfL) area to The Crown Estate, and the AfL was awarded in June 2014. Under the AfL, Minesto has exclusive rights to investigate the opportunity for a marine tidal energy development within the allocated area.

2.4 Scoping, consultation and public exhibitions

Prior to submitting an EIA Scoping Report (Minesto, 2013), Minesto consulted directly with a range of stakeholders and subsequently held a public stakeholder meeting in Holyhead on the 25th September 2013. The purpose of the event was to ensure that the wider community was aware of, and had positive reactions to the Project idea. An EIA Scoping Report³ for the Project was then submitted to the Natural Resources Wales (NRW) Marine Licensing Team (MLT) and the Marine Management Organisation (MMO)⁴ in November 2013.

A combined EIA Scoping Opinion⁵ from NRW MLT and MMO was received in February 2014 (NRW, 2014). It details the views of the statutory consultees and what they deem necessary for inclusion in the ES, and the accompanying Navigation Risk Assessment (NRA) required by the Maritime and Coastguard Agency (MCA). As well as statutory consultees, the EIA Scoping Report was also distributed to a number of non-statutory bodies. Following receipt of the Scoping Opinion each issue raised was reviewed and implications to the overall Project, as well as the EIA, considered. Where appropriate, further meetings and discussions were held, generally on a topic specific basis, throughout the EIA. These were necessary to refine the scope of EIA studies being undertaken, based on the Scoping Opinion received and/or results of EIA studies as they became available. This ongoing consultation was an important aspect in ensuring the EIA addressed all issues required in the appropriate manner.

For the NRA, consultation was undertaken with the MCA and other shipping, navigation, recreational sailing and fishing interests that navigate within and around the Project area. Consultation has included a number of meetings and a hazard review workshop with the MCA and other stakeholders. Through this process shipping and navigation characteristics within the Project area and potential risks to the Project have been identified. This information has been used to inform the risk assessment undertaken as part of the NRA.

³ Minesto (2013). Deep Green Project. Request to Natural Resources Wales and the Marine Management Organisation for an Opinion on the Scope of the Environmental Statement. November 2013.

⁴ EIA scoping considered a small array of devices from which electricity would be exported via a subsea cable to a grid connection onshore. A decision was later made that the initial application was to cover a single non grid connected DGU unit only, ahead of a future application for a larger array. The advice provided in the Scoping Opinion relevant to the DGU unit deployment offshore however still stands and has been used to inform the EIA for a single DGU unit. As a single DGU unit is under 1 MW, there is no requirement for a s36 application to the MMO, under the Electricity Act 1989 (or accompanying ES under the Electricity Works (Environmental Impact Assessment) Regulations (England and Wales) 2000 as amended)).

⁵ NRW (2014). Scoping Opinion Under The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended). February 2014.

On 21st May 2015 Minesto held a second public consultation event as part of pre-submission consultation on the Project, which took the form of a public display and question answer session with the Project team. A letter informing consultees of the event was issued in May 2015. Adverts were also placed in local newspapers and radio, and posters were placed in numerous public buildings such as libraries, shops and university buildings. The purpose of the event was to ensure that the wider community was aware of the Project proposals and was given an opportunity to comment on the Project prior to submission of the ES and Marine Licence application. Over 150 people attended the event from a wide range of groups and organisations.

On January 26th 2016, Minesto held a third public consultation event as part of pre-submission consultation on the Project. The purpose of the event was to update the wider community on Project progress including, updates to Project design that occurred since the last public event, and to disseminate the results of the EIA. The event was advertised via the same channels as the previous public event, described in the paragraph above.

Following submission of the Marine Licence application, notice of the application will be advertised as instructed by NRW (including local newspapers in the Anglesey area). Minesto will also make hard copies of the application and supporting documents publically available in key locations to facilitate inspection, in person, by members of the local communities in the vicinity of the Project. A statutory public consultation period will allow written representations on the Project to be made.

Consultation will continue beyond the submission of the application. Assuming successful award of Project consent, licence condition implementation will require continuing engagement and consultation with the regulators and their statutory consultees. In addition, Minesto will continue its communications with the local community and wider public to keep them informed of the Project progress and key milestones.

2.5 Environment overview

The offshore environment in the Project area is typical of the region. A general overview is provided below and further details are provided in the subsequent impact assessment sections. A map of the Project area and nearby environmental receptors is provided in Figure 2.5. The PDA is located within the Holyhead Deep, a large depression in the seabed where water depths reach a maximum of 97 m, although depths within the PDA range from 65 m to 91 m. The seabed in the PDA mainly comprises coarse sediments including gravel, pebbles and boulders.

Videos and photographs taken on the seabed in the Project area showed that the surface of the seabed was sparsely populated, and principally made up of species that are tolerant of the currents and tidal scour (abrasion from sediment in the moving water), such as anemones, hydroids and polychaetes (bristle worms). Grab samples obtained from areas with sufficient sediment cover showed that infaunal communities (animals that live within the seabed sediments) were more diverse. Several small patches of rock encrusted by the tube-building worm *Sabellaria spinulosa* were identified inside the PDA. The worms build their tubes by aggregating sand, gravel and shell fragments together, and in some circumstances, can form large structures elevated from the seabed, forming a biogenic⁶ reef, which is an internationally important habitat identified for conservation. The *Sabellaria spinulosa* aggregations inside the PDA were not sufficiently large or elevated to be considered as reef. A large area of stony reef was identified to the east of the PDA, which slightly encroached within the PDA's boundaries, and numerous habitats identified inside the PDA fall into the overall category of 'subtidal sands and gravels', which is a habitat of principal importance in Wales.

⁶ Produced by living organisms.

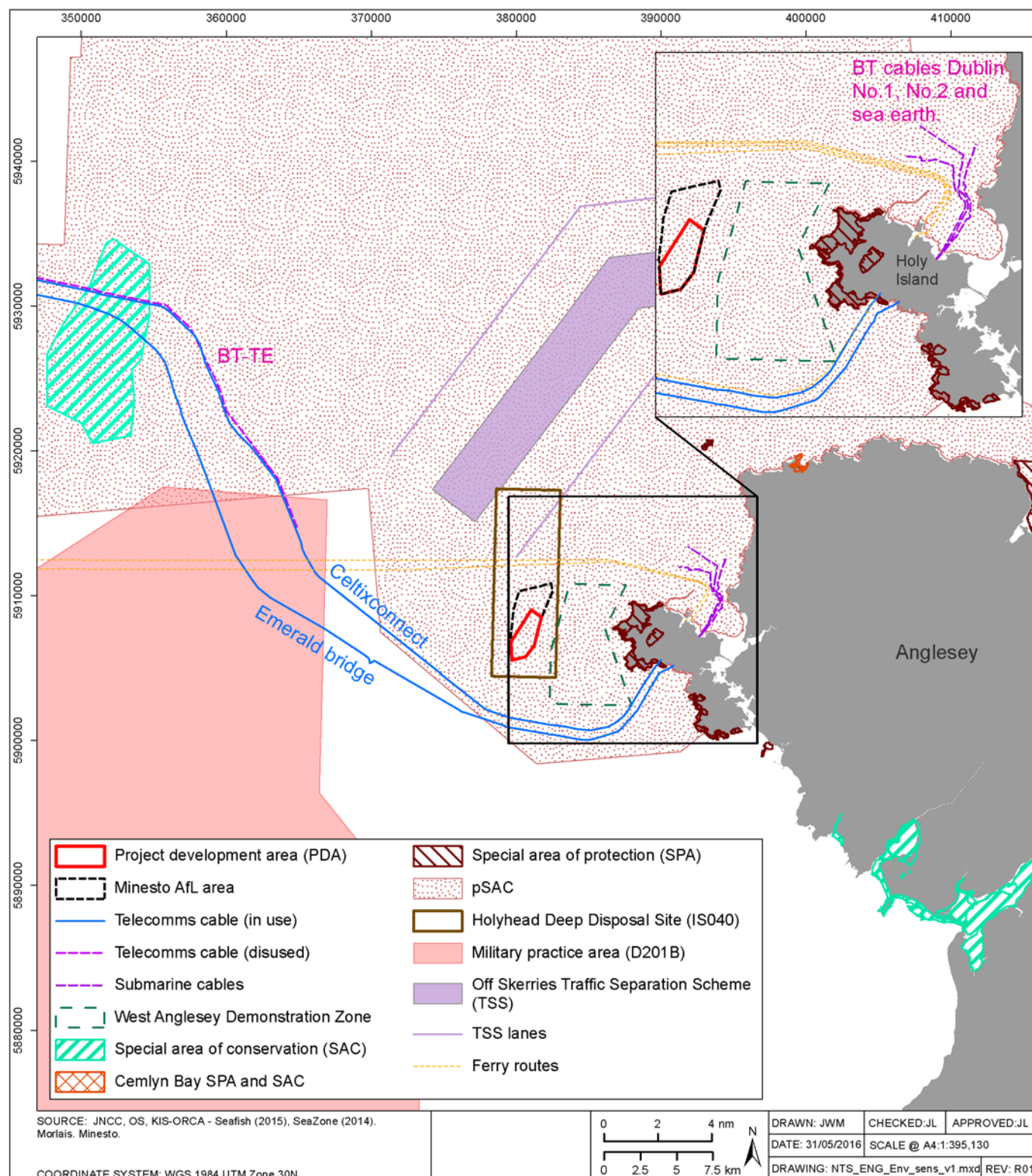


Figure 2.5 Environmental receptors in vicinity of Project

Surveys of the Project area undertaken in summer 2015 identified two species of marine mammal in the Project area: harbour porpoise and grey seal. It is also likely that bottlenose dolphin occasionally use the area, and several other marine mammals have the potential to be present, including minke whale, common dolphin, Risso's dolphin and harbour seal, as well as basking shark and marine turtles. A large variety of seabirds occur in the Project area. Four seabird species considered to be particularly sensitive to the proposed Project were identified, namely guillemot, razorbill, Atlantic puffin and northern gannet. Common guillemot is by far the numerous, but all four species are equally likely to be present in the vicinity of the Project throughout the year.

There are no Special Areas of Conservation (SACs) designated for Annex I habitats listed under the EU Habitats Directive within the 20 km of the Project area (as shown in Figure 2.5). There are a number of SACs off the coasts of Wales and Ireland designated for the protection of marine mammals listed under Annex II of the EU Habitats Directive, several of these are within the foraging distance of the Annex II species known to occur in the Project area (harbour porpoise, bottlenose dolphin and grey seal), and therefore have the potential to be ecologically connected. In addition to these existing designations, there are also four possible future marine SAC designations for harbour porpoise that have the potential to interact with the Project: a site running from Carmarthen Bay down to Cornwall (Bristol Channel Approaches pSAC), a site covering the Cardigan Bay and Pembrokeshire seas area (West Wales Marine pSAC), a site off the east coast of Northern Ireland (North Channel pSAC) and a site close to Anglesey (North Anglesey pSAC), which encompasses the Project area. These possible future sites went out to consultation in January 2016.

There are 32 Special Protected Areas (SPAs) designated for the protection of birds listed under Annex I of the Birds Directive within 141 km of the Project. Of these, 14 contain birds with mean maximum foraging ranges that are sufficient for potential interactions with the Project, either on a year-round, overwintering, passage or breeding basis. The closest site, the Holy Island SPA, is designated for Chough and therefore does not have the potential to be affected, since these species will not occur in the offshore Project area. There are several other protected sites of note, including the Calf of Man Nature Reserve on the Isle of Man, the South Stack RSPB Reserve situated on the coast close to the Project site, The Skerries RSPB Reserve, and Valley Wetlands RSPB Reserve. There are also four potential SPAs of relevance, one in south-west Pembrokeshire (Skomer, Skokholm and the seas off Pembrokeshire pSPA), one in North Cardigan Bay (Northern Cardigan Bay pSPA), one in the seas around Anglesey (Anglesey Terns pSPA), one encompassing Morecambe Bay and the Duddon Estuary (Morecambe Bay and Duddon Estuary pSPA), which went out to consultation in January 2016.

In addition to the above, there are various other conservation designations on the Holy Island coast, including a large Area of Outstanding Natural Beauty (AONB), Sites of Special Scientific Interest (SSSI), a designated heritage area and scheduled ancient monuments. There are no Marine Conservation Zones (MCZs) in the vicinity of the proposed Project. The closest MCZ is over 100 km to the north east. Based on the potential impacts predicted from the Project, it is not considered to be capable of affecting either protected features, or ecological or geomorphological processes on which the conservation of any protected features are dependant.

The most significant fishing activity in the inshore waters around Anglesey is potting, but generally outside of the area where the tidal device will be deployed. Pots and creels are used to catch shellfish such as whelks, lobsters and crabs. There is no sign that scallop, trawling or netting fisheries operate in the vicinity of the Project. Chartered and private angling vessels for recreational fishing and small numbers of recreational potting and recreational handlining vessels are active in the coastal waters around Holyhead.

The Project has been carefully sited in order to minimise the potential impact on shipping and navigation. The Project development area has been sited to avoid interactions with the busy commercial traffic routes to the north (vessel movements associated with the Holyhead harbour) and west (vessel movements associated with the Traffic Separation Scheme), and also avoids the movement of small craft (fishing and recreation vessels) in close proximity to the shore. Site-specific marine traffic surveys and review work showed that a total of four commercial main routes exist in the vicinity of Project, with a maximum of nine vessel transits per day. Commercial traffic including high speed craft, cargo vessels, passenger vessels, tanker vessels, tugs and dredging/underwater operations vessels represented the majority of marine traffic recorded throughout both the summer and spring surveys. An average of three recreational vessels per day were recorded throughout the summer survey.

The PDA is located within the boundaries of the Holyhead Deep disposal site IS040, a dredge disposal site that has been in active use since the mid-1980s. The PDA also intersects a closed disposal site (Holyhead South) and is located just over 1 km from another (Holyhead East). There are also two renewable energy projects in close proximity

to the Project area: the WADZ (approximately 1.2 km from the PDA) and Skerries Anglesey (approximately 18 km from the PDA). Although future development of the Skerries is unlikely to take place for several years, if at all, following the recent hand back of the AfL to The Crown Estate. Two active telecommunications cables pass within approximately 4 km of the PDA, both of which run between Holy Island and Ireland. There is no oil and gas infrastructure (including pipelines) in the area, nor are there any aggregate extraction areas, offshore wind farm projects or carbon capture storage facilities.

Several features of possible archaeological interest were identified within the PDA, including features of palaeogeographic potential and the potential for shipwrecks and/or aircraft crash sites to exist. In addition, 21 anomalies were encountered during seabed surveys, which may be of human origin.

3 ENVIRONMENTAL IMPACT ASSESSMENT

An EIA has been undertaken to assess the potential impacts of the proposed DG Holyhead Deep Project, using standard EIA methodologies and following established guidance. It has been informed by a number of Project specific surveys, desk-based reviews and technical studies. In order to retain some flexibility in certain Project design parameters, the EIA has made use of a 'Design Envelope' approach (also known as 'Rochdale Envelope'), whereby the impact assessment considers the worst case Project design configuration for each individual impact. This ensures that as the Project evolves, its design may vary within the parameters defined in the Design Envelope without changing the overall findings of the EIA. This approach has become standard in EIA practice, and has evolved over recent years as a result of lessons learned from previous projects and relevant case law.

Potential variances in the impacts predicted based on the different design options have also been summarised. Overall, there are no significant variances in predicted impacts for different design options, primarily due to the small scale of the Project. Although the Project is still to complete the detailed design phase, the level of information provided on the proposed design options is considered sufficient to describe and quantify the likely significant effects on the environment and identify suitable mitigation measures and monitoring requirements.

3.1 Physical processes

The predicted impacts of the Project on coastal processes have been assessed as not significant. The assessment that underpins this conclusion is summarised below.

The physical environment and sediment processes in the Project area were characterised using a combination of site-specific survey data and previously existing information. Depth-averaged mean tidal current velocities in the PDA are generally around 1 m/s, although they may exceed 2.5 m/s during spring tidal flow. The dominant flood tide direction is to the north-east, and the ebb direction is to the south-west. The PDA is characterised by varying sediment cover from bedrock to 50 m thick sediment.

There is potential for some limited areas of scour⁷ around the DGU foundation structure, so it may be necessary to install scour protection around the edge of each foundation. If a drilled DGU foundation solution is selected for the Project, a small quantity of drill cuttings may be released into the marine environment. The environment into which the drill cuttings will be released is highly energetic, so they will, for the most part, become widely dispersed into the surrounding waters, bringing about a localised and temporary increase in turbidity and very little in the way of perceptible sediment deposition. The ecological impacts of this are assessed in the appropriate topic e.g. benthic ecology.

The Project is anticipated to have no discernible effect on the tidal resource in the area, primarily due to the small size of the Project (i.e. a single device), the open water location and the water depths at the site. Potential interactions with the nearby WADZ are extremely unlikely for the reasons listed above, and because the two projects are not upstream/downstream of each other.

3.2 Benthic ecology

The predicted impacts of the Project on benthic ecology have been assessed as not significant following mitigation. The assessment that underpins this conclusion is summarised below.

A site-specific survey was undertaken to inform the benthic ecology impact assessment, to determine the types of species and habitats in the PDA. The survey of the offshore area consisted of video and still imagery, grab samples taken from the seabed and sonar imagery, which give information on the texture and depth of the seabed. Example photos from the two surveys are displayed in Figure 3.1.

The PDA was found to consist of mainly sand and gravel, with several small irregular patches of megarippled sand and gravel, including boulders. Several small patches of Ross worm encrusted rock were encountered in the PDA, but none were sufficiently large or elevated to qualify as the important reef habitat this species is known to create elsewhere. The vast majority of the seabed in the PDA comes under the classification of the Welsh habitat of principal

⁷ Erosion of sediments around the base of a structure caused by tidal or wave driven water flow.

importance 'subtidal sands and gravels'. This is the most common subtidal habitat in the UK and is also widespread across Europe.

The benthic ecology impact assessment considered a number of potential impacts in detail, including: direct physical disturbance and loss of habitat; release of drill cuttings and fluid; pollution of the water and sediment environment through the disturbance of existing contaminated sediments; introduction of invasive species; accidental discharges; modified hydrodynamic regime and sediment dynamics; and colonisation of introduced hard substrata.

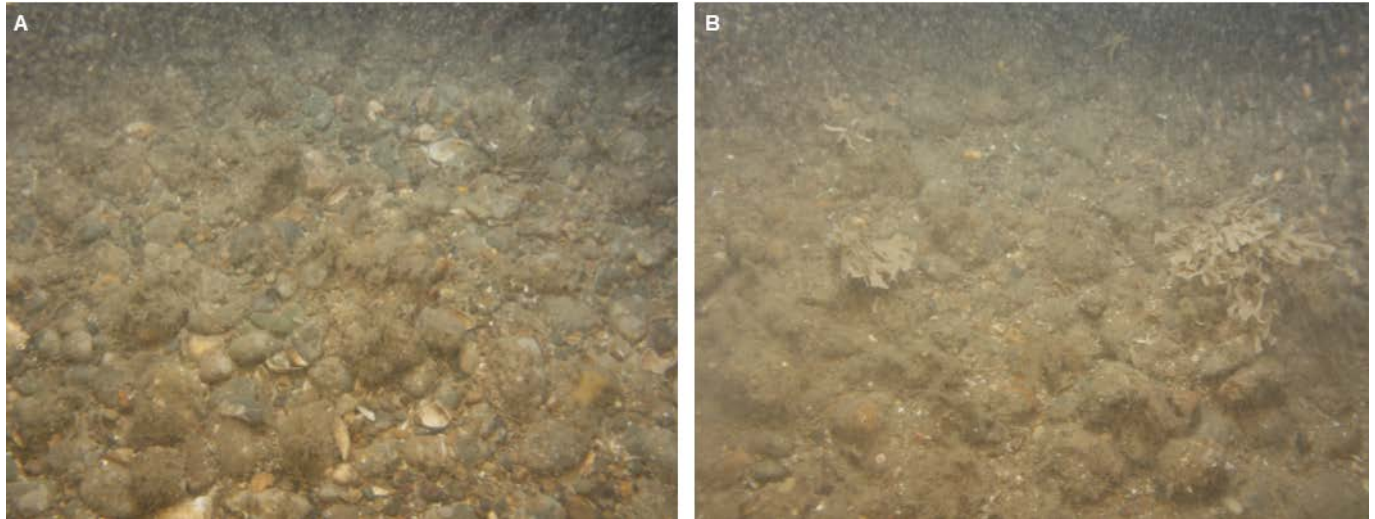


Figure 3.1 Habitats encountered during site-specific surveys of the PDA. A = Offshore circalittoral⁸ mixed sediment with shell fragments; B = tide-swept circalittoral mixed sediment with bryozoans and hydroids

Primarily due to the extremely small seabed footprint of the Project and high energy environment found in the area, all but two impacts were assessed as not significant without the need for additional mitigation. Placement of the seabed infrastructure will affect an extremely small proportion of the habitats identified during the survey, including the protected habitat 'stony reefs', which are prevalent in the survey area and wider region.. Similarly, the area over which scour may occur during operations will be limited to the immediate vicinity of the DGU foundation and will not significantly reduce the amount of available habitat in the Project area. The extremely small scale of the Project also means that the potential release of small amounts of drill cuttings (should a drilled foundation structure be used) and sediment disturbance will happen in an extremely small area for a very limited period of time, and the highly energetic environment is predicted to widely disperse and dilute any sediment and/or pollutants that are released.

Mitigation with respect to invasive non-native species (INNS) has been proposed because Anglesey is known to be a hotspot and the Welsh Government has invested a significant sum into monitoring and rectifying this issue. INNS are species that have been introduced to areas outside their natural range and are known to have a negative impact on marine ecosystems or economies. In order to minimise the risk associated with the introduction or spread of INNS, Minesto will: ensure all vessels associated with Project operations will comply with all relevant guidance (including IMO guidelines) regarding ballast water and transfer of INNS; strictly enforce appropriate measures and procedures for any installation vessel(s) that might need to utilise ballast water; and consider the need for a full INNS risk assessment once specific vessel details are known in order to identify whether any further mitigation measures are necessary.

⁸ The area of the continental shelf sea-bed that lies below the zone of periodic tidal exposure down to the maximum depth where photosynthesis is still possible.

3.3 Marine mammals and megafauna

Despite the occasional presence of internationally important species of marine mammal, the predicted impacts of the Project have been assessed as not significant. This conclusion is based on the impact assessment summarised below.

A review of literature on marine mammal presence in the Project area was ground-truthed using data from site-specific surveys. From this it was determined that harbour porpoise and grey seal (Figure 3.2) are likely to be present in the Project area, bottlenose dolphin may occur (but with a lower likelihood), and minke whale, common dolphin, Risso's dolphin and harbour seal, as well as basking shark and marine turtles, may occur as unlikely visitors.

There are a number of SACs off the coasts of Wales and Ireland designated for the protection of marine mammals listed under Annex II of the EU Habitats Directive, several of which are within the foraging distance of the Annex II species known to occur in the Project area (harbour porpoise, bottlenose dolphin and grey seal), and therefore have the potential to be ecologically connected. In addition to these existing designations, there are four possible future marine SAC designations for harbour porpoise that have the potential to interact with the Project: a site running from Carmarthen Bay down to Cornwall (Bristol Channel Approaches pSAC), a site covering the Cardigan Bay and Pembrokeshire seas area (West Wales Marine pSAC), a site off the east coast of Northern Ireland (North Channel pSAC) and a site close to Anglesey (North Anglesey pSAC), which encompasses the Project area. These possible future sites went out to consultation in January 2016.

The marine mammals and megafauna impact assessment considered several potential impacts, namely turbidity caused by construction works, noise caused by construction works and vessels, possible pollution events due to leaks or spills from vessels or the DGU unit, physical interactions with installation vessels, operational support vessels or vessel/barge (or similar) mooring systems, and physical interactions with the DGU unit or its tether and the umbilical.



Figure 3.2 Grey seal at sea surface

The potential sensitive receptors to such impacts are those species that have been identified as using the Project area. Marine mammal species are predicted to infrequently interact with the Project devices, especially considering the short period during which construction works will be undertaken and the small size of the development. Any interactions that do occur are unlikely to lead to impacts to individuals and even less likely to affect the species at the population level. Considering the highly limited extent, both spatially and temporally, of potential effects, few, if any, marine mammals are likely to be impacted by the Project. As such, an effect at the population level of any species using the Project area is not expected and therefore no significant impacts are anticipated.

Through extensive stakeholder consultation, physical interactions with the DGU was highlighted as the most concerning potential impact mechanism; however, a bespoke collision risk modelling exercise conducted to inform the impact assessment revealed that the number of marine mammals passing the DGU deployment area and coming into contact with the device that would be necessary to cause population level effects was far higher than any of the literature/site-surveys suggest is possible.

Despite this, due to the novel nature of the Deep Green technology, Minesto is committed to understanding the potential interactions between marine mammals and the Deep Green technology. As such they intend to develop an adaptive monitoring strategy commensurate with the risks identified in the impact assessment. In all likelihood this will be achieved through collaborations with NRW and specialist research bodies and/or academic institutions such as SEACAMS, so as to ensure the production of high quality output that will be of significant value to future projects. The scope of the monitoring plan will also be informed by monitoring of other tidal array projects as results of their monitoring becomes available.

3.4 Ornithology

Despite the year round presence of certain seabird species in the Project area, the predicted impacts of the Project to ornithology are considered not significant. The assessment that underpins this conclusion is summarised below.

A detailed desk-based review of surveys previously carried out in the vicinity of the Project area and more general regional information was undertaken to determine which species occur in the Project area. This information was combined with data on typical foraging distances from breeding colonies derived from tagging studies to give an indication of the likely connectivity between birds using this area and breeding colonies, the size of the receptor populations potentially affected and the current status of these populations.

There is the potential for seabirds to be present in the Project area throughout the year, although the number and behaviour of species will vary seasonally. The full list of species that may occur was screened on the basis of species' sensitivity to potential effects and their habitat selection. The list was confirmed through the scoping and consultation with NRW. Four potentially sensitive seabird receptor populations that could plausibly be affected by the Project were identified, namely common guillemot (Figure 3.3), razorbill, Atlantic puffin and northern gannet, all of which are likely to be present throughout the year. Common guillemot is by far the most numerous of the four species.

There are 32 Special Protected Areas (SPAs) designated for the protection of birds listed under Annex I of the Birds Directive within 141 km of the Project. Of these, 14 contain birds with mean maximum foraging ranges that are sufficient for potential interactions with the Project, either on a year-round, overwintering, passage or breeding basis. The closest site, the Holy Island SPA, is designated for Chough and therefore does not have the potential to be affected, since these species will not occur in the offshore Project area. There are several other protected sites of note, including the Calf of Man Nature Reserve on the Isle of Man, the South Stack RSPB Reserve situated on the coast close to the Project site, The Skerries RSPB Reserve, and Valley Wetlands RSPB Reserve. There are also four potential SPAs of relevance, one in south-west Pembrokeshire (Skomer, Skokholm and the seas off Pembrokeshire pSPA), one in North Cardigan Bay (Northern Cardigan Bay pSPA), one in the seas around Anglesey (Anglesey Terns pSPA), one encompassing Morecambe Bay and the Duddon Estuary (Morecambe Bay and Duddon Estuary pSPA), which went out to consultation in January 2016.

The ornithology impact assessment considered disturbance to and displacement of seabirds as a result of construction, operation and maintenance activities, which could effectively lead to a localised reduction in the availability of foraging habitat; collisions between diving birds with the operational DGU unit; surface pollution from accidental contamination incidents and indirect effects to habitat and prey.

Overall, it was concluded that disturbance and displacement impacts will have negligible significance for all bird species examined, primarily as a result of the very low number of individuals predicted to be affected, which is highly unlikely to lead to population level effects. Although some of the bird species in the area are highly sensitive to surface pollution, the potential impact of accidental pollution incidents was assessed as not significant, contingent on the strict compliance with the mitigation measures designed to reduce the risk of occurrence and scale of accidental contamination incidents.



Figure 3.3 Guillemots of sea surface (photo by Digger Jackson)

Potential mortality rates resulting from collisions between diving birds and the operational DGU were evaluated using encounter rate modelling. Using cautious assumptions with respect to average seabird densities, connectivity to regional breeding colonies and behavioural avoidance, it is predicted that very small numbers of adult common guillemot and razorbill from regional breeding populations could be killed annually through collision mortality. These numbers were assessed as negligible in the context of the predicted baseline level of annual mortality. The predicted annual number of collision deaths of puffin and gannet is well below one adult per year and therefore trivial. All four species have a medium to long term increasing population status, so it is concluded that the impact of collision mortality will have negligible significance.

Despite the impact assessment predicting impacts are unlikely to be significant, Minesto believes that understanding the diving behaviour of birds around tidal devices and the risk of collisions occurring is fundamental for the industry

to progress. It is therefore proposed that this potential impact is considered as strategic research and monitoring approaches be developed in cooperation with regulators, stakeholders and other developers. Minesto will work with the regulator and its advisory bodies to agree details of appropriate monitoring, including whether site specific monitoring at this Project site is appropriate.

3.5 Fisheries

Despite the presence of a number of different fisheries in the Project and surrounding areas, impacts resulting from the Project have been assessed as not significant following mitigation. This conclusion is based on the impact assessment summarised below.

The impact assessment was informed by a desk-based review of available data, supported by consultation with local fishermen. Overall, shellfish form the most important component of commercial fish landings in this area, both in terms of volume and value. The most significant fishing activity in the inshore waters around Anglesey and close to the Project area is potting, whereby pots and creels are used to catch shellfish such as whelks, lobsters and crabs (Figure 3.4). There are no indications that scallop, trawling or netting fisheries operate in the vicinity of the Project. Chartered and private angling vessels for recreational fishing and small numbers of recreational potting and recreational handlining vessels are active in the coastal waters around Holyhead.

The presence of a single DGU unit, the barge (or similar) and its potential safety zone⁹, will impact a small area used for fishing around Holy Island, amounting to a monetary value of just under £800 per year. The key commercial fishery likely to be impacted employs static gear and targets whelks in the PDA. Fisheries closer inshore e.g. recreational and lobster fisheries will not be impacted by the proposed Project. Impacts in the PDA will affect fisheries throughout the life of the Project, i.e. a maximum of five years.

Minesto will follow 'Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison' issued by the Fishing Liaison with Offshore Wind and Wet Renewables (FLOWW) group and continue to use a Fisheries Liaison Office (FLO) during the Project.

Further consultation is still required with the MCA and DECC regarding safety zones, or other methods of protecting against fishing gear interaction. The agreed strategy, whether mandatory or advisory, will be implemented and notified to UKHO for suitable depiction on Admiralty charts.

3.6 Shipping and navigation

No significant shipping and navigation impacts are predicted as mitigation measures to increase awareness and increase safety are proposed. The assessment underpinning this conclusion is set out below.

A Navigation Risk Assessment (NRA) was undertaken to identify the risks in the Project area and in the vicinity of the Project area. The NRA for the Project followed the Maritime and Coastguard Agency (MCA) and the Department for Energy and Climate Change (DECC) guidance for such assessments. This included baseline data collection to obtain information on the vessel activities in the vicinity of the Project, comprising 28 days of radar survey, visual surveys, analysis of seasonal Automatic Identification System (AIS) data, desk-based information and consultation with local stakeholders and experts in this field.



Figure 3.4 Creels used to fish for crabs

⁹ This is not a standard industry measure and further consultation with navigational stakeholders is planned to support the application.

As previously described, the Project has been carefully sited to minimise the potential impact on shipping and navigation, as this area of the Irish Sea is relatively busy. Four main commercial main routes were identified in the study area¹⁰, two of which transit to/from Holyhead Port. Commercial traffic (high speed craft, cargo vessels, passenger vessels, tanker vessels, tugs and dredging / underwater ops vessels) represented the majority of marine traffic recorded throughout both the summer (85.0% of marine traffic within study area) and spring (87.4% of marine traffic within study area) surveys. In addition a number of small vessels (recreational and fishing) were also recorded. An average of three recreational vessels per day were recorded throughout the summer survey (Figure 3.5). Overall it was concluded that the PDA has been carefully sited in order to minimise the potential impact on shipping and navigation, with only 1.7% of marine traffic recorded intersecting its boundaries.



Figure 3.5 Sailing yacht

The potential hazards and risks to this vessel activity represented by the Project, including the DGU, barge (or similar) and associated infrastructure, have been assessed based on consultation, a Hazard Review Workshop involving a cross-section of all relevant stakeholders, and quantitative risk modelling. Risks considered in the assessment include vessel collision risk, collision with the DGU, fishing and anchor interaction with Project infrastructure, and collision with the barge.

No high/unacceptable risks were identified following the implementation of both embedded and enhanced Project specific mitigation measures. The greatest risk identified is the presence of the barge on site for period of up to five years, although this was reduced to an acceptable level through the inclusion of enhanced mitigation measures, including active monitoring of marine traffic by barge (radar / AIS / lookout); advanced distribution of information; barge safety zone (subject to further consultation¹¹); use of AIS Aid to mark barge; and the use of radar reflectors to increase return echo of barge.

3.7 Marine archaeology and cultural heritage

Impacts on marine archaeology and cultural heritage have been assessed as not significant. The impact assessment underpinning this conclusion is summarised below.

The marine archaeological baseline was defined using a combination of desk based review and site-specific geophysical data. Two cut and fill features of palaeogeographic potential were identified in the Project area. No wrecks were identified in the PDA, but the desk-based review highlighted that there may be potential for shipwrecks dating from the Mesolithic to the modern period, as well as aircraft crash sites dating from the 20th century and in particular World War II.

Twenty-one geophysical anomalies of possible anthropogenic origin were encountered in the offshore Project area (Figure 3.6).

The marine archaeology and cultural heritage impact assessment considered two principal impact mechanisms by which heritage assets may be affected by the Project. The first is direct physical impacts, which covers archaeological receptors buried in seabed sediments or resting on the seabed that may be directly affected by activity that makes contact with the seafloor or cuts through seabed deposits. Archaeological receptors with height, such as wrecks, may also be impacted by development or activities that occur within the water column. The second is indirect physical changes to the physical marine environment, which may occur as a result of changes to prevailing physical processes caused by the Project, including interruption of sediment transport causing potential increase or decrease in

¹⁰ The study area is based on a 5 nm buffer around the proposed Project development area. This buffer has been used as it is considered best practice for navigational risk assessment and it presents sufficient area to capture the relevant information for the Project in terms of baseline data.

¹¹ It is Minesto's intention to apply for a safety zone around the barge to protect personnel working on board. This is not a standard industry measure and further consultation with navigational stakeholders is planned to support the application.

protection to an asset, and the effects of scouring. Based on the results of the coastal processes and sediment dynamics impact assessment the potential for indirect impacts was scoped out of the EIA and the assessment focused on direct impacts only.



Figure 3.6 Potential seabed anomaly

The Project will not have any effect on the setting of marine heritage assets. However, the setting of several terrestrial heritage assets was identified as having the potential to be affected by the Project, including six prehistoric scheduled ancient monuments, eight Grade II listed buildings (including those associated with the South Stack Lighthouse shown in Figure 3.7) and five undesignated heritage assets. A site visit was undertaken to conduct a full assessment of the potential impact on these receptors, as well as to assess whether other unidentified receptors existed. Photomontages produced as part of the seascape and landscape and visual amenity impact assessment were also used to support the settings assessment. Overall, no significant impacts were identified. The barge (or similar) and support vessels would be visible throughout the five years the Project will be present, but this will not alter the setting, since marine traffic is already an established part of the baseline conditions off the west coast of Holy Island. Furthermore, the Seascape, Landscape and Visual Impact Assessment (SLVIA) concluded that the large intervening distance between viewpoints on Holy Island and the barge and the vessels associated with the Project significantly reduce its prominence, making it a very extremely small element in the overall landscape/seascape.

Several mitigation measures have been identified to avoid, reduce or minimise the potential for impact to heritage assets located in the PDA, these include: assessment of any palaeoenvironmental material recovered and implementation of a Protocol for Archaeological Discoveries for the reporting of archaeological discoveries made during the course of the Project.



Figure 3.7 South Stack lighthouse

All aspects of any further archaeological work will be detailed within a Written Scheme of Investigation, which will be prepared prior to the initiation of any Project works. The instigation of such strategies will ultimately reduce the impacts on marine cultural heritage resulting in no significant impact.

3.8 Seascape and landscape and visual amenity

Overall no significant effects on seascape/landscape character and visual amenity are predicted to occur as a result of the offshore Project. The assessment underpinning this conclusion is summarised below.

The proposed Deep Green Holyhead Deep Project is positioned in a sensitive location in relation to potential effects on seascape/landscape character and visual amenity. This is reflected in the designation of the closest part of the Isle of Anglesey as an Area of Outstanding Natural Beauty and the coastline is designated as Heritage Coast. These designations both reflect the scenic quality of the seascape/landscape and as a consequence draw visitors for outdoor recreation and enjoyment of the local character, as well as a number of local residents living along the coastline. The published seascape/landscape character assessment information for the study area analysed reinforces these sensitivities and identifies the associated special qualities.

The key potential change that would result from the Project relates to the introduction of a barge (or similar), which would be moored over 5 km from the north-west coastline of Holy Island for a period of up to five years. This would be a temporary and reversible change. With regards to the vessels used to install and service the Project, vessel movements are a common and typical component of the existing baseline and this, together with the distance from the coastline and the temporary and reversible nature of the change, would limit potential effects.

3.9 Other sea users

No significant impacts on other sea users are predicted following mitigation. The impact assessment underpinning this conclusion is summarised below.

The other sea user (in addition to fisheries, shipping and navigation) that may be affected by the proposed Project are users of the Holyhead Deep disposal site IS040.

The PDA is located within the boundaries of the Holyhead Deep disposal site IS040, a dredge disposal site that has been in active use since the mid-1980s. An average of 85,000 tonnes of material is disposed of each year, and the only current licensee is Stena Line Port Limited, who use the site to dispose of spoil from maintenance dredging at Holyhead Port. Re-designation of the disposal site's boundaries to accommodate the Project has the potential to reduce its carrying capacity, however, this is highly unlikely to impact current or future users, especially in light of a recent modelling study that showed that in its current configuration, the site could sustain between 176 and 530 times more material than is currently deposited there.

Despite the WADZ tidal demonstration Project being located only 1.2 km from the Minesto PDA, the construction, installation and operation of the Minesto DG Holyhead Deep Project will not directly impact the WADZ. In fact, the inshore area within which the WADZ is located supports different fisheries, shipping and recreational activities compared to the deeper and more distant offshore waters of the Holyhead Deep, so even from a cumulative impact perspective, potential impacts are very limited.

In addition to potential impacts on other sea users there is also the potential for the presence of unexploded ordnance (UXO) in the form of historical military practise exercises and training and a legacy from two World Wars. If UXO are present then there is a risk that equipment or personnel involved in installation activities could inadvertently come into contact with UXO. A detailed assessment of munitions and UXO presence in the Project area will be carried out as part of the planning geotechnical survey which will be carried out to inform detailed design of the Project. Based on the results of this survey, Minesto will examine measures for reducing the risk from inadvertent interaction with munitions and UXO to personnel and the Project As Low As Reasonably Practicable (ALARP).

3.10 Hydrocarbon and chemical releases

Appropriate mitigation measures and management measures are proposed to minimise the potential for hydrocarbon and chemical spill to occur. These include measures to prevent an incident occurring, management plans to minimise

spills from vessels and emergency response procedures. The probability of a large spill occurring is extremely remote and with the proposed mitigation no significant impacts are predicted.

3.11 Socioeconomics, tourism and recreation

The Project is predicted to have a number of positive indirect and induced economic impacts and no significant negative effect on tourism and recreation. The impact assessment underpinning this conclusion is summarised below.

Following the recent closure of several major industrial employers on Anglesey, the main sources of employment are in tourism and the ferry port at Holyhead. Consequently, Gross Value Added (based on income) is low, with GVA per head recorded as being the lowest in the UK in 2013. However, with the Anglesey Energy Island Programme, it is anticipated that Anglesey will, in the long term become a major energy hub, resulting in the creation of thousands of jobs and building an economy worth up to £12 billion.

Anglesey is an important location for tourism, attracting between 1.5 and 2 million visitors per year. The ability for the area to provide access to a wide range outdoor, marine and coastal based activities and pursuits is a key part of the island's recreation and tourism industry.

The Project will have a number of positive impacts in terms of local employment and GVA in Anglesey. Several Full Time Equivalent (FTE) jobs have already been recruited at the Minesto Headquarters at Holyhead, with several more positions being recruited this year. Pending the successful performance of this Project, Minesto will create significant additional job opportunities in the areas of project management, engineering, assembly, construction and installation, testing and commissioning, operations, maintenance and servicing. In terms of economic impact and GVA there will be a potential investment of £10 million associated with the Project.

There are a number of recreational activities that take place in the vicinity of the PDA. Potential impacts on recreational fishing and recreational sailing are assessed elsewhere and have been assessed as not significant. Potential impacts on other coastal and marine recreational activities will also be negligible and not significant on the basis that most activities are concentrated on the coast or in the marine area close to the coastline and inshore of the PDA.

The barge (or similar), which will be moored on site for up to five years will potentially be visible from numerous viewpoints on Holy Island. However, the intervening distance between Holy Island and the barge is such that its relative scale and prominence are greatly diminished. As such, the barge would form a relatively small scale element in a location where frequent vessel movements form an established part of the baseline. It is therefore considered unlikely that impacts on the character of the AONB or a loss in scenic view quality off the west coast of Holy Island due to the presence of the barge will result in any reductions in visitors to the area.

Overall there will be negligible impact on tourism and recreation and a number of positive indirect and induced impacts on employment and GVA at a regional (North Wales), National (Wales) and UK level. The Minesto Project will not replace the hundreds of jobs lost with the closure of the aluminium smelting works and impending closure of the Wylfa nuclear power station. However, the Project and associated local investment will make a significant positive contribution towards creating new employment opportunities on Anglesey and stimulating longer term growth and investment in Anglesey as a hub for marine energy as set out in the Anglesey Energy Island Programme.

3.12 Cumulative and in-combination impacts

The cumulative and in-combination impact assessment details the potential interactions between the impacts arising from the Project, other marine renewable developments in the region and other regulated activities. Cumulative impacts are impacts caused by planned and consented offshore wind farms. In-combination impacts are impacts as a result of marine renewables (and their associated activities) combined with impacts from other marine activities or users of the sea.

Cumulative and in-combination impacts have been considered for all topics and all Project phases. The projects included in the assessment were varied and included 10 other marine renewables projects and 16 offshore wind farm projects, as well as interconnectors, telecommunications cables, disposal sites, aggregate/dredging areas and onshore projects.

The projects for which there exists the greatest potential for cumulative impacts to occur are as follows:

- > The Skerries Anglesey project, comprising five tidal turbines devices, (although the development of this project is currently unlikely to take place for several years, following the recent hand back of the AfL to The Crown Estate by Atlantis Resources Ltd);
- > The Morlais WADZ project, which will be larger, and also have the potential for cumulative impacts, will most likely be constructed once the Project is operational; and
- > The Minesto Phase II project, involving the potential installation of an array of DGUs.

The potential for cumulative impacts to occur is extremely low, primarily due to the fact that the only Project whose construction phase could possibly overlap with that of the Project is the smallest (the Skerries Anglesey), but as mentioned, the future of this project is uncertain. Morlais and Minesto are planning on sharing the same export cable, thereby reducing the combined environmental footprint of the two projects.

Looking more widely, although there is potential for cumulative and in-combination impacts to occur, due to the small scale and limited spatial extent of the impact footprint associated with the Project, the very small scale of the DG Holyhead Deep Project itself, and the large separation distances between it and other developments, cumulative and in combination impacts are not considered to be significant.

Highly mobile species such as marine mammals may be exposed to noise emissions from multiple projects, thus excluding them from potential foraging areas, but their home ranges are likely to cover far wider areas and as a result it is unlikely that cumulative impacts of temporary disruption to normal behaviour in a small area will adversely affect them. The collision impact assessment highlights that there may be a risk to a proportion of some marine mammal populations from the presence and operation of the DGU, and the potential for this risk to be intolerable at the population level may be increased should other tidal projects also represent a risk of collision. There are likely to be multiple tidal projects within the home range of certain marine mammal species. However, the scale of the DG Holyhead Deep Project is extremely small in comparison to for example the WADZ, so the cumulative contribution to the overall collision risk is extremely small.

Based on the assessment above, there is no requirement for any mitigation over and above that proposed at a Project level.

4 ENVIRONMENTAL MANAGEMENT

4.1 Environmental Management Plan (EMP)

EIA, including consultation with stakeholders, is an iterative process that will continue beyond ES submission. The primary mechanism for ensuring that the environmental assessment continues and that all environmental issues are addressed throughout the lifetime of the Project is through the Project Environmental Management Plan (EMP) which will be implemented as part of the overall Operational Management System for the Project.

The EMP will provide the overarching framework for on-site environmental management for the protection of environmental interests. It will be a working document which details consent conditions, the commitments outlined in the ES and compliance monitoring requirements. It will also highlight the parties that are responsible for the implementation of the contents of the EMP.

The EMP will be developed and implemented in agreement with the relevant stakeholders, including NRW and their statutory advisors following a successful award of Project consents. This is necessary to ensure that all ES mitigation commitments, consent conditions and environmental monitoring requirements are implemented as required.

4.2 Mitigation

The potential impacts of the Deep Green Holyhead Project have been assessed through the EIA and NRA processes and the results of the impact assessment presented in the ES (and accompanying NRA and Habitats Regulations Assessment (HRA) reports). These processes have indicated it is necessary to manage certain aspects of the Project to ensure potential impacts are not significant. Some of the key mitigation measures that have been identified include:

- > Standard industry practice with regard to the management and mitigation of shipping and navigation activities will be followed in addition to Project specific mitigation (also known as enhanced mitigation), the specific details of which will be agreed as part of ongoing consultation with the MCA, Trinity House and other navigational stakeholders. This includes consideration for the implementation of safety zones during installation, construction and commissioning, virtual aids to navigation, inclusion of the tidal device on Admiralty Charts for the area and consultation with other sea users on navigational restrictions through Notices to Mariners, provision of information at local ports and harbours and updates to sailing charts and almanacs;
- > Throughout the Project, Minesto will continue to liaise with the local fishing community through the Project FLO in accordance with the FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison;
- > To inform detailed design of the tidal array, Minesto will carry out a geophysical survey of the Project area. Information from this survey will be used to carry out a more detailed examination of possible marine archaeology anomalies identified in the Project area. To further minimise any potential impacts on any potential sites or features of marine archaeological importance, Minesto in, consultation with Cadw, Gwynedd Archaeology Trust (GAT) and other relevant stakeholders will prepare a mitigation strategy and reporting protocol which will set out a series of staged steps for the avoidance, investigation and, if required, reporting of archaeological remains that could be impacted by the Project; and
- > Emergency response plans will be prepared for the Project in accordance with relevant guidance setting out measures to reduce risk of, and manage potential impacts from, any accidental fuels spills from vessels and the barge involved in the installation and operation of the Project or leakage of lubricants from the devices.

4.3 Environmental Monitoring Strategy (EMS)

Due to the emerging and ever evolving nature of the tidal energy industry there are some potential impacts that have yet to be verified by operational monitoring. As part of the EIA, Minesto has made use of available data from the monitoring of the existing 1:4 scale DGU deployed in Strangford Lough, Northern Ireland. However, Minesto recognises that there is still little data currently available and its application to the assessment of tidal arrays is limited.

Minesto has identified that individual developers do not have access to adequate resources to address all known data gaps and uncertainties. This situation means that Minesto has identified two proportionate approaches to monitoring:

- > Where Minesto identifies monitoring requirements for the Project, specific monitoring protocols will be developed in consultation with the regulators and their advisors; and
- > Where uncertainties in the assessment are identified that are considered to be of strategic importance to the development of the tidal energy industry, Minesto would wish to engage with the wider industry, regulators, their advisors, stakeholders and academic institutions through involvement on working groups or similar forums in order to assist with developing strategic monitoring programmes for the benefit of future projects and the wider tidal industry.