3 NEED AND ALTERNATIVES CONSIDERED

Introduction

3.1 This chapter of the ES provides a summary of the need for the proposed development and the main alternatives considered by MHPA during the evolution of the project and the EIA process. It includes a summary of the reasons for the selection of the site, together with a description of the alternative design and layout options that have been considered.

3.2 Further information is provided in the Planning Statement and Design and Access Statement that accompany the planning application as well as in the supporting information for the associated Listed Building Consent and Conservation Area Consent applications, which includes Chapter 10 (Historic Environment) of this ES and its associated figures and appendices.

Need for the Development

3.3 The overarching need for the development stems from the growing requirement to decarbonise the UK and Wales' energy systems in order to combat climate change, which is evidenced in the following key commitments that the United Kingdom and Wales has subscribed to:

- United Nations Framework Convention on Climate Change: The Paris Agreement (2015):
  - The Paris Agreement aims to strengthen the global response to the threat of climate change by keeping a global temperature rise this century below 2 degrees Celsius above pre-industrial levels, and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.
- Intergovernmental Panel on Climate Change Special Report on Global Warming of 1.5°C:
  - In October 2018 the Intergovernmental Panel on Climate Change (IPCC) published a Special Report regarding the potential impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.
  - The report sets out that the pathways limiting global warming to 1.5°C with no or limited overshoot would require rapid and far-reaching transitions in, inter alia, energy, land and infrastructure, and imply deep emissions reductions in all sectors.
- Welsh Government Climate Emergency Declaration.

3.4 On 29 April 2019 the Welsh Government declared a 'climate emergency', recognising:

"… it threatens our health, economy, infrastructure and our natural environment"

- Welsh Government Commitment to 95% Reduction in Greenhouse Gases:

- On 11 June 2019 the Welsh Government also accepted the Committee on Climate Change recommendation for a 95% reduction in greenhouse gas emissions and an ambition to go further to reach net-zero by 2050. The target is proposed to be introduced in legislation in 2020.

3.5 The Pembroke Dock Infrastructure (PDI) project forms part of the Swansea Bay City Deal (SBCD) signed on 20 March 2017, which is a £1.3 bn investment in 11 major projects across the Swansea Bay City Region (SBCR), made up of Carmarthenshire, Neath Port Talbot, Pembrokeshire and Swansea.

3.6 The SBCD is being funded, subject to the approval of project business cases, by the UK Government, the Welsh Government, the public sector and the private sector.

3.7 Over the next 15 years, the SBCD will boost the regional economy by £1.8 bn and generate almost 10,000 new, high-quality jobs.

3.8 The SBCD projects are based on key themes of Economic Acceleration, Life Science and Well-being, Energy, and Smart Manufacturing. Each project will be supported by world class digital infrastructure and a Skills and Talent Initiative that will give local people a pathway to access the jobs that will be created.

3.9 Pembroke Dock Marine (PDM) is identified as a project within the SBCD (http://www.swanseabaycitydeal.wales/energy/pembroke-dock-marine/) that will:

- *"Generate a world class energy base in the region;*
- *Accelerate development in marine energy technology;*
- *Improve the capacity and capability in wave, tidal and wider offshore renewables engineering in the region;*
- *Maximise the natural assets of the region to produce environmental and economic benefits;*
- *Attract continued investment to the region;*
- *Make marine energy more reliable and cost-effective."*

3.10 The SBCD states that PDM, via the proposed development, PDI, will regenerate an area of Pembroke Port to create a dedicated site which will be used as a base by marine energy developers to progress their devices from an idea to a commercial product. The project will allow developers to test, manufacture and maintain offshore renewable energy devices and will be supported by additional developments of marine infrastructure and commercial support via the development of:

- A Marine Energy Test Area ('META') – a series of areas along the waterway where developers can test devices at an early stage of development;
- The Pembrokeshire Demonstration Zone (PDZ) – a large offshore wave and floating wind energy site which can be used by developers to test more developed devices in open sea conditions; and
- The Marine Energy Engineering Centre of Excellence ('MEECE') – to coordinate and share knowledge, resource, experience and capacity between existing and future developers.

3.11 The first phase of META was granted a marine licence (reference: DEML1875) on 10 June 2019 and planning permission (reference: 18/1231/PA) on 14 June 2019. This is expected to commence operation in late 2019.

3.12 PDZ is at EIA Scoping stage with consent anticipated by 2022 and will facilitate the demonstration of wave array projects of up to 30 MW.

3.13 Whilst Pembroke Port is already in the process of consolidating its position as a centre for marine renewable energy, for example five renewable technology developers are based in Pembroke Dock and five prototypes have been constructed in the Port by the supply chain, other proposals are being considered for the use of the Port for:

- Wave energy developers;
- Tidal stream energy developers; and
- Floating wind turbine foundation fabrication.

3.14 In the case of each marine renewable technology, the areas required for fabrication, assembly and activity associated with full scale devices are large. The feedback received from potential operators (see Appendix 3.1) is that Pembroke Port would need to deliver the necessary improved facilities within a fixed timescale.

3.15 Marine renewable fabrication (including invention and manufacturing) work can use port facilities for long periods and rarely use berths or quayside areas. However, while quayside land is used for the last stages of fabrication and launching of these large devices, preferably via slipway; the Port would cease to be able to function efficiently in its current format and purpose as a cargo handling port due to the insufficient quayside and laydown space currently available.

3.16 The PDM project is also anticipated to give rise to the need for additional tugs, other work boats (such as offshore maintenance and service vessels) and a wide range of vessels in the Milford Haven Waterway. These would require routine maintenance and potentially fabrication on dry land within a high bay facility, which does not exist along the Milford Haven Waterway currently. Therefore, a need for a high bay ship repair and fabrication facility has also been identified that can be accommodated at Pembroke Port.

3.17 The proposed development is therefore designed to allow the Port to continue to operate efficiently whilst also creating a flexible and efficient port-related office, industrial, warehousing and distribution, and ancillary area. This will be capable of meeting the needs of the burgeoning marine energy economy in accordance with the aspirations of Welsh Government, the SBCR and Pembrokeshire County Council, thereby providing a significant contribution to the local and regional economy. It is also set to deliver services and facilities to other blue economic sectors such as shipbuilding, oil and gas, aquaculture.

Alternatives Considered

3.18 The EIA Regulations require that an ES should include:

"A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects' (Schedule 4(2))."

3.19 This section therefore sets out the key reasons for the selection of the proposed development site and current layout, taking into account environmental effects and also considers other potential alternatives to the currently proposed scheme.

Site Location

3.20 Pembroke Port, since its construction in the 1810s, has consistently evolved to meet the needs of the marine industry it serves. Given the context of the SBCD as set out above and the long-established use of the Port, the site was considered appropriate for the proposed development by the Applicant for several reasons set out below.

3.21 The site is relatively flat, underutilised brownfield land in an established industrial area in proximity to relatively deep water in the Milford Haven. The site is considered suitable for marine works in the form of an enlarged multi-purpose slipway given the absence of any statutory designation within the Milford Haven Waterway adjoining Pembroke Port.

3.22 It is the closest port to Pembrokeshire's significant marine energy resources such as wave and tidal stream, and to the region's fast-growing floating offshore wind opportunity. Proximity to resource ensures maximum operational efficiency and is a key reason for developers to establish a long-term development and operations base.

3.23 The site has access to the consented META Phase 1 sites which makes the innovation and test process more efficient for developers helping to reduce costs and reach commercialisation faster.

3.24 It has an extensive high-skill engineering supply chain that has been delivering services to the region's traditional oil and gas sector. This supply chain is already starting to successfully diversify its skill base into renewables (Ledwoods and Mainstay Marine are examples of local businesses that are securing renewables contracts). The proximity of this existing skill base and experience is another key part of the region's attractiveness to developers.

3.25 It also benefits from access to existing energy infrastructure such as the region's 5 GW grid connection and high capacity gas pipeline.

3.26 Developers are already in the region, attracted by the elements listed previously. They see value in the site developing as an operational base. They are currently testing at scale but as the move towards full size operations will mean the current proposition will become weaker and the proposed facilities and spaces will ensure operations can continue into maturity uninterrupted.

3.27 The county benefits from a dedicated engineering educational facility that recently benefitted from a £4 m investment. There is a ready-made skill set coming through the education system that will be employable at the site.

3.28 In addition to access to the Milford Haven Waterway, Pembroke Port also benefits from very good transport links in the form of the A477, which connects to the A48 and M4 to the east, and Pembroke Dock rail station, which is located approximately 1.2 km to the east of the site.

3.29 Pembroke Port is located close to the steelworks and associated supply chain along the south Wales M4 corridor managing associated shipping costs and carbon footprint and maximises the potential for maximising Welsh content and associated economic impact.

3.30 The delivery site is within Pembroke Dock. The town is fully developed with established infrastructure and services to support the associated workforce. The town is considered to be in need of economic regeneration with limited access to year-round employment.

3.31 It is being delivered in Pembrokeshire, a region with limited access to rewarding career opportunities. As such, school leavers typically leave the region for their working years resulting in a skewed population. The county is exposed to higher per head public service costs as a result.

3.32 It is within realistic steaming distance of Anglesey and the Bristol Channel so is well placed to support the Nuclear sites at Hinkley and Wylfa Newydd and the tidal energy development projects at Morlais, sharing Pembrokeshire's skills and innovation activity and maximising the potential to keep more production and associated financial benefits within Wales.

3.33 All of the above effectively combine to provide a unique opportunity, especially in West Wales, and so it was decided to concentrate on Pembroke Port as a location for the PDI project.

Site Area

3.34 The site to be used for the proposed development within the Port extends to approximately 11.10 ha of underutilised brownfield land. Combined with proximity to and existing activities within the adjoining Pembroke Dock Ferry Terminal (PDFT) and Gate 1, the site area provides a critical mass of marine activities and expertise to support the development of a marine renewable energy cluster within Pembroke Port.

3.35 The area of 11.10 ha is considered the minimum necessary to accommodate the PDI project.

Site Layout and Design

3.36 An evaluation of site constraints and opportunities from consultation with industry was undertaken to inform the site layout and design. The project presents an opportunity to provide:

- A large multi-purpose slipway that will extend towards deeper water;
- Large areas of hardstanding in proximity to the quayside;
- Areas of flat land for use either as 'laydown' or capable of being developed to create buildings in response to time-sensitive business requirements;
- Enhanced interconnectivity between Gate 1 and Gate 4.

3.37 The proposed development will therefore, in accordance with the aspirations of the SBCD, facilitate the efficient transfer of marine renewable devices and vessels between land and sea and at the same time, via the formation of large open areas and within new buildings.

3.38 Constraining factors that affected the project layout and design included:

- The location of the Port within Pembroke Dock Conservation Area;
- Listed buildings located within the site;
- Listed buildings in the vicinity of the site;
- Scheduled ancient monuments in the vicinity of the site;
- Ecological considerations (including habitats and the presence of reptiles, bats, badgers and marine ecology);
- Milford Haven Registered Historic Landscape;
- Mature trees within and adjacent to the site;
- Market attractiveness;
- Facilities fit for purpose over the life of the project;
- Buildings of sufficient height to ensure fabrication and maintenance works could be carried out.

3.39 The EIA process has influenced the iterative design process of the proposed development, through the identification of the above constraints, responses during the consultation process, and identification of environmental effects. Therefore, there have been several iterations and refinements to the layout of the project.

3.40 The proposed layout of the site once indicated the part infill of the Timber Pond to provide an employee car park with part of the side elevations of the pond retained. However, a consolidation of building requirements to within Gate 4 and later feedback in terms of operator employee requirements indicated the area would be insufficient for project car parking needs and the area would be better utilised as a fabrication building.

3.41 The initial proposals for the site included the complete demolition of the Grade II listed Former Foremen's Office to facilitate the movement of large renewable energy devices through the site. To avoid the demolition of this building, the MHPA commissioned consultants to undertake detailed swept path analysis to determine if equipment could be transported without the necessity to demolish the building. The analysis determined the building could remain and the proposed layout of the site was amended to retain the Grade II listed Former Foremen's Office whilst ensuring the transfer of vessels and devices around the site would not come into conflict with the building.

3.42 The current Proposed Masterplan is provided in **Figure 2.2** of this ES. **Figures 3.1 to 3.11** illustrate the 'design evolution' of the site layout between 2015 and 2019 in arriving at the current Proposed Masterplan. The reasons for the site layout evolution are documented in the Pembroke Dock Marine Supplementary Information to the Full Business Case Extract at **Appendix 3.1**.

Other Alternatives

Do Nothing

3.43 Doing nothing was not considered a practicable or sensible solution given that PDI forms part of a named project (PDM) within the SBCD.

3.44 Doing nothing would also represent a missed, once in a generation, opportunity for Wales to be at the forefront of a developing marine energy sector and to benefit from the economical outcomes of that opportunity.

3.45 Doing nothing would also disregard the well-being of future generations, not only economically but socially and in terms of the environment and the decarbonisation of energy systems in Wales. The Welsh Government is committed to cutting greenhouse gas emissions by 95% by 2050 and declared a 'climate emergency' on 29 April 2019. Projects such as PDI will be crucial in achieving Wales' greenhouse gas emissions target and addressing the climate emergency and will also have other well-being benefits such as creating employment both directly and indirectly as well as helping to sustain existing businesses and facilities in the area.

3.46 Pembrokeshire's economy is heavily reliant on the oil and gas industry. Since its peak capacity, the Waterway has seen refinery closures and weakened supply chain resilience. The most recent closure, Murco, had an impact throughout the region. With a wider move towards decarbonised energy, the county has capability and capacity to rebalance its economy and weather any further impact to the traditional fossil fuel energy sector.

3.47 Doing nothing would also reduce the ability to maximise Welsh productivity. Not just in Pembrokeshire but also in its role as a potential support to other energy and engineering projects in the wider locality (Morlais and Hinkley Point C).

Construct PDI at Another Port Location within SBCR

3.48 PDI is supported by SBCR through the SBCD. Therefore, to undertake a site search outside of the region would be unreasonable. As explained above, within the Swansea Bay City Region there are no other port sites available that have relatively flat, underutilised brownfield land located in an established industrial area that have access to relatively deep water, an industry ready supply chain and are located in close proximity to energy source (Pembrokeshire has the highest concentration of wave resource in Wales equating to an indicative capacity of up to 5.6 GW providing a significant opportunity for development of the industry [Marine Energy Wales, 2020]) and complementary projects such as META, Phase 1 of which is already consented adjacent to Pembroke Port, and the PDZ. Convenience and proximity to these sites and other areas of renewable resource is a key operational requirement for marine energy device developers focused on reducing the cost of energy production to become comparable with existing energy sources. Therefore, constructing PDI at another port location within SBCR was discounted accordingly.

Construct PDI Elsewhere within the Port of Milford Haven

3.49 In terms of other sites, the Milford Haven Waterway, other than adjacent to Pembroke Port, is a statutorily designated Special Area of Conservation (SAC), and an alternative site within the Milford

Haven Waterway would therefore pose significantly greater marine ecology constraints than the application site.

3.50 As set out above and within Chapter 2, the key site requirements are a large area of relatively flat land located close to relatively deep water. Whilst Hobbs Point, to the east of Pembroke Port, is located close to relatively deep water, the area available for development is not of the necessary scale. To create an area of sufficient scale at Hobbs Point would require extensive and complex land assembly and acquisition or even reclamation. Any such reclamation would be either within or in proximity to the SAC.

3.51 Furthermore, a largely new build port facility, either at Hobbs Point or elsewhere in the Port of Milford Haven, would likely be prohibitively expensive when compared to the proposed development.

3.52 In summary, there are no other suitable or viable sites within the Port of Milford Haven other than the application site due to a combination of geology, benthology, topographic, ecology and viability reasons.

Construct PDI Elsewhere within Pembroke Port

3.53 As set out in Chapter 2, the central third of Pembroke Port is operated by Irish Ferries with associated ferry terminal infrastructure and facilities that it would be expensive, difficult and ultimately unfeasible to relocate elsewhere within the Port.

3.54 Gate 1 already possesses a multi-purpose quay, having seen its historic slipways, berths and docks (see Chapter 10 – Historic Environment) infilled to create flat quayside areas close to deep water. Gate 1 is already a busy cargo port with growth in volumes expected and congestion within the operational area already being experienced on occasions. As such, capacity at Gate 1 is expected to be exceeded soon. Whilst the potential to accommodate the infrastructure associated with PDI, in the form of the mega slipway and other large buildings, at Gate 1 was considered, that would simply necessitate the relocation of the flat quayside areas and buildings from Gate 1 to the Gate 4 area with the infilling of the Graving Dock, Slipways 1 and 2 and the Timber Pond still being required.

3.55 Consideration of other alternatives to the proposed ‘mega’ slipway for land-marine transfer of devices and vessels considered and rejected included:

- Refurbishment and upgrade of the Graving Dock;
- A vessel hoist;
- Jack up barge; and
- Floating dry dock.

3.56 A Preliminary Feasibility Study was undertaken in 2010 for the refurbishment or upgrade of the Graving Dock to understand whether it was capable to be used for modern deeper draft and wider vessels. The study concluded that this would involve the dock floor being lowered and sides widened to accommodate larger modern vessels in addition to a new dock gate, operating equipment, pumps and sluices. This would necessitate the existing stone masonry floors and side walls being removed and

the dock entrance being altered substantially. It was also identified that a new steel caisson would be required. Essentially this would comprise the complete dismantling and replacement of the Graving Dock, failing to preserve its historic integrity and would furthermore be uneconomical and contrary to operator preferences.

3.57 The remaining options would also necessitate the infilling of the Graving Dock and Slipways 1 and 2 in order to create the necessary flat quayside area and the associated removal, or obscuring of parts of, the quayside walls. These options would also encroach further into the Haven and potentially have a greater impact on the SAC. Furthermore, operator feedback has expressed the preference for a large multi-purpose slipway as opposed to the other marine transfer options identified above.

3.58 Another option that was considered was moving the mega slipway to the eastern quayside within Gate 4. However, this was discounted because it would result in the complete removal of the Graving Dock and the infill and obscuring of Slipways 1 and 2, which would have a more significant impact upon those heritage assets than the current proposals.

3.59 An alternative of leaving the Graving Dock in its current condition was also considered. The retention of the Graving Dock in this manner would, however, sterilise a significant area of land, circa 1.15 ha (just over 10% of the site area and over 20% of the operational area), in a desirable location adjacent to the quayside. Such a reduction in the developable and operational area of land at the site would reduce commercial opportunities and the overall viability of the project significantly. It was also considered that this would not necessarily preserve the Graving Dock and its features, including the caisson, which would continue to be situated in the marine environment and be affected by coastal processes. In the absence of a viable re-use of the Graving Dock and the inability to feasibly maintain the caisson, in particular, in its current location, due to access and health and safety issues, the asset is likely continue to deteriorate over time in a 'do nothing' scenario.

3.60 Similarly, an alternative of leaving the Timber Pond in its current condition was considered. However, this would similarly reduce the developable area of the site by approximately 10% (over 20% of the operational area) and would also restrict the width of the required transport corridor, resulting in a 'pinch point' which would impede operational activity. Furthermore, there is no other viable location within Gate 4 for the 11,900 sq m fabrication building that is required for PDI other than in this position.

Amendments to PDI at Gate 4 to Reduce its Environmental Impact

3.61 Consideration has been given to modifying PDI within Gate 4 to reduce the impact of the proposal on environmental receptors, including those changes listed in paragraphs 3.36 to 3.42 above, Figures 3.1 to 3.11 and Appendix 3.1 in particular.

3.62 In a similar way to how the Admiralty designed the Dockyard at its inception, the locations of the buildings have been carefully considered throughout the iterative design process with efficiency in mind. Regarding the fabrication process and Building A, a focus has been placed on importation of goods and materials and the transition to deployment into the water, as follows:

- Goods in and small-scale fabrications are targeted in Area D and Building C.
- Once complete, small scale assembly of and large scale fabrications will be targeted in Building A.

- Final assembly and deployment will occur in Area F1/F2 or on the proposed new slipway.

3.63 There are synergies between the proposed development and developments of similar scale such as Cammell Laird in Birkenhead. A comparable arrangement can also be seen at the Nigg Energy facility in the Cromarty Firth, although in this instance no slipway is available.

3.64 For operations and maintenance purposes and Building B, it is imperative that a building capable of accommodating vessels and fabrications that access the site from the marine environment via the slipway is available. Vessels often require blasting to clean off decay and remove debris which can cause environmental harm if not mitigated. Historically, this process has been done in the open but as a responsible developer, the applicant's preference is to provide facilities that can eliminate and potential impact on the Milford Waterway SAC and have proposed Building B in that location to enable this. Having this building in close proximity also allows the slipway to be utilised more effectively as vessels will be able to transition out of the production pathway for new builds from Building A.

3.65 Consideration was also given in terms of lowering the height of proposed Buildings A and B so that they did not project beyond the skyline when viewed from the north side of the Haven to minimise landscape and visual impact. The proposed development envisages the need for large buildings in order to facilitate the envisaged activities on site. Buildings A and B are proposed for fabrication, assembly and maintenance of engineered structures. A fabrication hall's useful height is normally referred to as 'under the hook' height. This is height at which the buildings' internal gantry crane can operate. Using the example again from Cammell Laird, the useful under the hook height is approximately 36 m with overall building height of 50 m.

3.66 Early design options considered replicating buildings of this scale but following the signing of the SBCD heads of terms engaged the market to understand the height and overall width of components required from technology developers in the wave, tidal stream and floating wind foundation sectors as well as other industry groups (ship building, nuclear etc). This process has informed a range of under the hook height of 22-25m. This represents an 83% increase on the under the hook height of Celtic Building at the site, which was built in 2014 and is occupied by Mainstay Marine.

3.67 Pre-application consultation with CADW and Pembrokeshire County Council assisted in developing a design solution that incorporated mansard sides and a shallow curved roof to emulate the former slipway covers that existed at the site. Subsequently, the applicant engaged the services of structural engineer to calculate the dimensions of the structural steel work to support the building structure and overhead gantry crane system required.

3.68 These section drawings were then used to determine the under the hook height compared with current capacity in the Dockyard and future requirements of industry. Figures, 3.12 and 3.13 illustrate the heights of current capacity and some of the potential future devices, components and vessels that could be produced or maintained internally within the buildings and demonstrate that the maximum building height is necessary to accommodate those operators should they be attracted to the site.

3.69 Regarding trees and terrestrial habitats, two Category A and several Category B trees exist within the south eastern and eastern parts of the site. There are also protected species in the form of bats and former badger sett that has now been closed. The south eastern perimeter of the site, including existing

trees, was identified as a potential bat corridor in discussion with the County ecologist and an area has been reserved as such on the proposed masterplan.

3.70 The main considerations in respect of heritage are set out in the preceding section. Having regard to those and the other environmental considerations above, the application proposal is considered to be the best option available in terms of the impact of the project on the environment whilst also addressing the identified need. In summary, in comparison to other options for PDI at Pembroke Port, it would:

- Preserve the Grade II* Graving Dock and Grade II Timber Pond structures, albeit beneath ground, in a reversible manner to preserve their fabric for future generations. The infill of the Graving Dock would also necessitate the removal of its caisson, which would be retained, removed, assessed, preserved and repositioned within the site together with the capstans and bollards;
- Preserve the function and the majority of the outermost flank walls of Grade II listed Slipways 1 and 2;
- Retain the Grade II listed Former Foremen's Office;
- Retain the Grade II listed Dockyard Walls.
- Retain high quality habitats including mature trees within the south east of the site;
- Provide for protected species of a bat corridor along the south eastern boundary;
- Minimise impact on the Pembrokeshire Marine SAC;
- Remove several buildings that do not contribute positively to the Conservation Area and the setting of listed buildings currently;
- Facilitate the provision of high-quality new buildings that will add to a sense of place.

3.71 In conclusion, it is considered there is a significant identified need for the project in the context of the Swansea Bay City Deal, UK and Welsh Government carbon reduction targets, the declared climate emergency and economic regeneration and all reasonable alternatives to the proposed development have been considered but discounted as less preferable to the proposed development.

Chapter 3 References

Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (2017 SI No.567)

Marine Energy Wales website: https://www.marineenergywales.co.uk/marine-energy-in-wales/the-resource/ 2020