

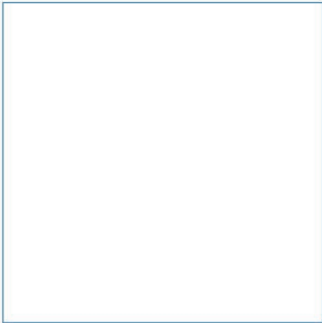
# Port of Mostyn

## Mostyn Energy Park Extension

Environmental Statement

Chapter 3: Project Methodology

December 2022



Innovative Thinking - Sustainable Solutions

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# Mostyn Energy Park Extension

Environmental Statement



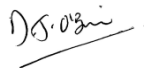
Chapter 3: Project Methodology

December 2022



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# Contents

3	Project Methodology .....	1
3.1	Construction phase .....	1
3.2	Operational phase .....	5
3.3	Environmental management best practice procedures.....	7
3.4	References.....	7
3.5	Abbreviations/Acronyms.....	8

## Table

Table 3.1.	Indicative programme for the proposed development.....	5
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## Figures

Figure 3.1.	Key construction elements comprising MEPE Project.....	2
Figure 3.2.	Potential mudflat restoration areas.....	4
Figure 3.3.	Proposed maintenance dredge area.....	6

## 3 Project Methodology

The project methodology described in this chapter comprises a reasonable worst-case project risk envelope to address any potential uncertainty in the scheme design and construction methodology at this stage. The design of the individual elements comprising the Mostyn Energy Park Extension (MEPE) Project has taken into account the level of information currently available, along with outputs from the design process suitable to concept level. Final dimensions and methodology are subject to detailed design and will be refined following the appointment of a contractor.

### 3.1 Construction phase

#### 3.1.1 Quay wall construction

The proposed development will involve the creation of an uninterrupted 360 m linear section of new quay wall, thereby meeting the needs of the offshore wind sector and improving vessel safety and operational efficiency. The retained height of the new wall is to be 23 m. The alignment of the new quay is designed to retain as much of the existing quay structure as deemed acceptable.

The works will involve the construction of a new return wall tie-in to the northern head of the existing breakwater and a southwestern connection with the existing quay. A short section of the existing quay wall at the interface between the new and existing quay walls will be excavated and partially demolished to enable the new quay wall structure and tie rods to be installed.

The new quay wall will be constructed as a combination pile wall ("combi-wall"), involving tubular piles with AZ sheet piling infill, with a permanent tie anchored with individual tubular steel piles. This will require *circa* 200 steel tubular piles of a maximum diameter of 2.0 m and approximate length of 30 m. The piles will be driven using both impact (percussive) and vibratory piling methods to reach the required design depths. It is anticipated that each pile will involve approximately 20 minutes of vibro driving and up to 2 hours of percussive driving. Piling works are anticipated to be carried out by up to two piling rigs working 24/7, with each rig installing around one pile per day. The piling rig(s) will be either set up on jack up barges or alternatively a temporary raised stone bund will be constructed behind the line of the new quay wall to provide a stable platform or pad for the crane and associated piling rig(s). The overall programme for the piling works is approximately 12 months subject to weather conditions.

A concrete capping beam will be provided to the top of the new quay wall to enable mooring bollards, fenders and other required marine fixtures (e.g. emergency ladders and grab chains) to be installed along the new quay.

#### 3.1.2 Reclamation

The approximately 3.49 ha area of the existing harbour that will be reclaimed between the new quay wall and the existing breakwater will require approximately 600,000 m<sup>3</sup> of infill material to reach a final fill height of 12 m above CD. The general finished surface level will match the existing level of the quay.

Existing Ro-Ro pontoon and linkspan, work boat access pontoon, work boat recessed berth and mooring structures within the footprint of the reclamation will be demolished and re-used within the port estate. Some of the existing materials (e.g. dolphins) may be reused as part of the proposed development (Section 3.1.5).

The engineering grade fill requirement within the reclamation is proposed to be fully met by reusing a selected proportion of the suitable capital dredge arisings from the berth pockets and main navigation channel (Section 3.1.3). The dredge arisings will be pumped or rainbowed in over the top directly into the reclamation area by the dredger. The infill material is proposed to be vibro-compacted to improve its properties and minimise settlement, and distributed evenly across the reclamation area.

### 3.1.3 Capital dredging, disposal and reuse of dredge material

A capital dredge will be required to create a new berth pocket alongside the 360 m section of new quay wall and to dredge the existing berth pocket along the existing quay wall (. ). The new berth pocket will be deepened to a depth of -11 m Chart Datum (CD) plus a 1 m overdredge allowance. The total volume of capital dredge material from the berth pocket is approximately 400,000 m<sup>3</sup>, including side slopes and overdredge allowance, over an area of approximately 40,000 m<sup>2</sup> (4 ha). The existing berth pocket will be dredged to a design depth of -9 m CD. The total dredge volume is estimated to be approximately 100,000 m<sup>3</sup>, including side slopes and overdredge allowance. The dredge pocket side slopes for both the new and existing berth pocket will be approximately 1 in 5 below CD and approximately 1 in 20 above CD.



Figure 3.1. Key construction elements comprising MEPE Project

The main navigation channel will need to be deepened to a depth of – 4 m CD as is already consented (DML1542v2). The total volume of capital dredge material that needs to be removed from the main navigation channel is estimated to be up to 3 million m<sup>3</sup>. The capital dredge areas are shown on Figure 3.1

The capital dredge material comprises predominately sand (90 %) with some silt (10%) in the upper recently deposited layer. The physical properties of the capital dredged material make it suitable for use as engineering fill material. A selected proportion of the suitable capital dredge arisings are, therefore, proposed to be reused as engineering fill material for the reclamation (see Section 3.1.2).

Due to the nature of the material to be dredged, the berth pockets are likely to be dredged by a cutter suction dredger and the main navigation channel is anticipated to be dredged by a trailer suction hopper dredger (TSHD). The material that is removed is proposed to be disposed of and/or reused as follows:

- Up to 600,000 m<sup>3</sup> to be pumped directly ashore into the reclamation area to be reused as fill; and
- Up to 3 million m<sup>3</sup> to be transported and disposed of at the existing Mostyn Deep disposal site (IS102).

### 3.1.4 Potential construction of Ro-Ro linkspan pontoon

There is a potential requirement for a Ro-Ro linkspan pontoon to be installed at the interface of the new quay wall with the existing quay wall, in the inner corner of the harbour. Two alignment options are being considered, one set within the new quay wall and the other along the existing quay. The dimensions of this linkspan pontoon will be approximately 20 m by 24 m. The potential linkspan pontoon may require 1 or 2 guide piles to be installed. No additional dredging is anticipated to be required.

### 3.1.5 Potential relocation of existing dolphins

There is a potential requirement for the existing Ro-Ro dolphins (piles) at the Port of Mostyn to be relocated in the south-eastern part the Port to create a berth for SOVs to provide O&M requirements of the offshore wind sector. The total length of this potential SOV berth will be approximately 120 m. No additional dredging is anticipated to be required for the berth pocket . The Ro-Ro dolphins (piles) are a maximum diameter of 2.0 m and, if required, are anticipated to involve the same installation methods and equipment as the new quay wall construction (Section 3.1.1).

### 3.1.6 Landside works

The reclaimed area will comprise hardstanding that will be used primarily as a storage/laydown area for turbine components. It is anticipated that the infill material within the reclamation area that has been compacted will be topped with a capping layer of crushed graded rock fill to provide a finished surface that meets the requirements of the proposed operational activities. Specially loaded areas are likely to require a reinforced concrete foundation (potentially piled) to facilitate the spread of loads. No other landside works or infrastructure are proposed as part of the MEPE Project.

### 3.1.7 Environmental enhancements

In order to enhance the marine ecology of the port area and surroundings, approximately 1.5 ha of rubble (brick, debris, slag deposits, concrete etc.) is proposed to be scraped back from the toe of the rock armour along the western section of the dock estate to expose intertidal mudflat habitat on the Mostyn Bank (Figure 3.2). This will allow silt to settle in the areas where the hard substrate is scraped back, supporting natural mudflat restoration. This remediation work will be undertaken on rock armour on the upper sections of the Mostyn Bank that are typically above mean high water neaps (MHWN), and consist of relatively barren rubble that exhibits very limited colonisation by epifauna species.



Figure 3.2. Potential mudflat restoration areas

### 3.1.8 Construction programme

There is demand for an operational offshore energy facility at the Port of Mostyn by early 2025. In order to meet this demand, and based on the proposed design and methodology, an indicative programme for the MEPE Project is included in Table 3.1.

**Table 3.1. Indicative programme for the proposed development**

Project element	2021	2022				2023				2024				2025
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Submission and determination of licence applications					x	x	x							
Preliminary and detailed design	x	x	x	x	x	x	x							
Construction works							x	x	x	x	x	x	x	x
Quay wall construction								x	x	x	x			
Reclamation									x	x	x	x	x	
Capital dredging and reuse of capital dredge material									x	x	x	x	x	
Relocation of existing dolphins											x	x	x	
Landside works											x	x	x	
Site operational														x

## 3.2 Operational phase

### 3.2.1 Maintenance dredging and reuse/disposal of maintenance dredge material

Once the constructed quay is operational, a maintenance dredging and disposal programme for the new and existing berths will be put in place. The marine works will also comprise the continued ongoing maintenance dredging of the navigation channel to a depth of -4 m CD. The maintenance dredge area is shown as the red line application boundary on Figure 3.3.

The maintenance dredge area comprises a polygon that shows where maintenance dredging of the navigation channel may take place in response to the natural movement of the Salisbury and Mostyn channels. In reality, any dredging that is required will be limited to one main channel that is dominant at any given time and will not take place across the entire area of the polygon. This will minimise the volume of dredging that is required and, therefore, the environmental and cost implications.

The total volume of maintenance dredge material that is permitted to be dredged is up to 900,000 tonnes (approximately 600,000 m<sup>3</sup>) per annum under the existing dredge marine licence (DML1542v2) and an additional 99,990 tonnes (approximately 66,660 m<sup>3</sup>) per annum under the existing dredge marine licence (DML2001). The total volume of maintenance dredge material that needs to be removed from the new berth, harbour and navigation channel is estimated to be up to 600,000 m<sup>3</sup> per annum which remains within the cap set in the existing marine licences.

A range of dredging methods, including TSHD, plough and water injection dredging (WID) techniques are likely to be used for the maintenance dredge activities as per the existing licences.

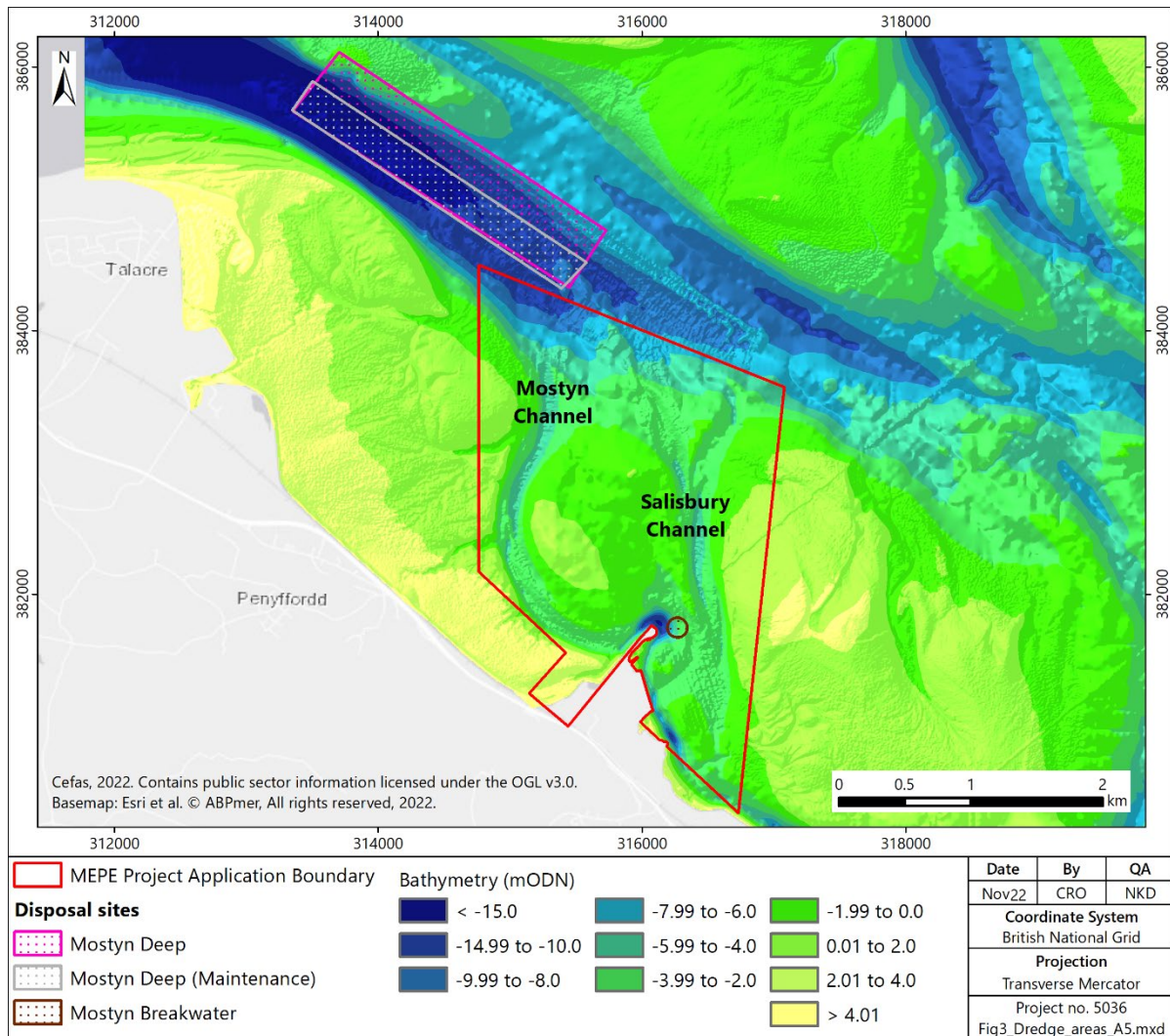


Figure 3.3. Proposed maintenance dredge area

The maintenance dredge material comprises predominately fine to medium sand (60-70 %) with smaller variable proportions of silt (30-40 %). The material that is removed is proposed to be disposed of and/or reused as is currently permitted under the existing maintenance dredge and disposal marine licences, specifically:

- Up to 900,000 tonnes (approximately 600,000 m<sup>3</sup>) per annum to be transported and disposed of at the existing Mostyn Deep disposal site (IS102);
- Up to 99,990 tonnes (approximately 66,660 m<sup>3</sup>) per annum to be pumped through a floating pipeline directly into the existing Mostyn Breakwater disposal site (IS103); and/or
- Up to 150,000 tonnes (approximately 75,000 m<sup>3</sup>) per annum to be pumped ashore into a prepared site at the Port of Mostyn to be beneficially used in other projects.

### 3.2.2 Berth and port operations

The MEPE Project will accommodate offshore jack up installation vessels used in the construction of wind farms (e.g. Jan De Nul's *Voltaire*) as well as SOVs. SOVs involved in offshore wind activities,

generally involve a technician crew of up to 60 people. In addition, the MEPE Project will provide quayside storage space for the engineering consumables and parts associated with the construction of the wind farms and SOV operations.

### 3.3 Environmental management best practice procedures

Best practice environmental management techniques will be implemented by contractors during construction. Techniques and measures will follow appropriate industry guidelines for the activity, such as the following:

- British Standards Institute (BSI) (BSI, 2021), for example BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites (BSI, 2008);
- Eurocodes The EN Eurocodes (Eurocodes, 2021);
- Construction Industry Research and Information Association (CIRIA) Environmental good practice on site guide (CIRIA, 2015);
- CIRIA Coastal and marine environmental site guide (CIRIA, 2016);
- Office of Government Commerce (OGC) Construction Excellence Guidelines (OGC, 2022);
- Pollution Prevention Guidance (PPG), or Guidance for Pollution Prevention (GPP) (NetRegs, 2022), including:
  - Understanding Your Environmental Responsibilities – Good Environmental Practices (PPG1);
  - Works and maintenance in or near water (GPP5);
  - Working at construction and demolition sites (PPG6);
  - Safe storage and disposal of used oils (GPP8);
- Regulatory guidance (UK Government, 2022); and
- The Construction (Design and Management) (CDM) Regulations 2015.

Adherence to environmental management best practice will be controlled through a Construction Environmental Management Plan (CEMP) in accordance with guidance (IEMA, 2016). The CEMP will be provided to NRW prior to works commencing and will set out the mitigation measures needed to manage environmental effects.

### 3.4 References

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### 3.5 Abbreviations/Acronyms

BS	British Standards
BSI	British Standards Institute
BSOL	British Standards Online
CD	Chart Datum
CDM	Construction, Design and Management
CEMP	Construction Environmental Management Plan
CIRIA	Construction Industry Research and Information Association
EN	European Standards
GB	Great Britain
GPP	Guidance for Pollution Prevention
IEMA	Institute of Environmental Management and Assessment
MEPE	Mostyn Energy Park Extension
MHWN	Mean High Water Neaps
NRW	Natural Resources Wales
O&M	Operation and Maintenance
OGC	Office of Government Commerce
PPG	Pollution Prevention Guidance
Q	Quarter
SOV	Service Operation Vessel
TSHD	Trailing Suction Hopper Dredger
UK	United Kingdom
WID	Water Injection Dredging

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SI units are used unless otherwise stated.

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