

# Replacement Linkspan, Fishguard Port

## Environmental Statement\_Harbour Revision Order

### *Non Technical Summary*





## 1.0 INTRODUCTION

### 1.1 Introduction

This Environmental Statement (ES) is provided in support of an application of a Harbour Revision Order (HRO) under the provisions of the Harbours Act 1964, made by Eversheds Sutherland (International) LLP, to the Marine Management Organisation (MMO), on behalf of Stena Line Ports Limited, in respect of the proposed replacement linkspan at Fishguard Port, Pembrokeshire, Wales.

A notice of intended application, under paragraph 3(a) of Schedule 3 to the 1964 Act was given to the MMO on 29<sup>th</sup> November 2017; a copy of the notice is provided in Volume III, Appendix 1.1.

This ES should be read in conjunction with the HRO application and all supporting information including the following drawings:

- M0680-RPS-00-XX-DR-C-2000 Demolition & Site Clearance
- M0680-RPS-00-XX-DR-C-6000 Replacement Linkspan Plan
- M0680-RPS-00-XX-DR-C-6001 Replacement Linkspan Section

The proposed development is described in detail in Chapter 2 of this ES.

### 1.2 Environmental Impact Assessment Screening and Scoping

#### 1.2.1 Environmental Impact Assessment Context

Environmental Impact Assessment (EIA) is a key instrument of European Union environmental policy and a procedure required under the terms of European Union Directive 2014/52/EU on assessment of the effects of certain public and private projects on the environment Article 2 of the Directive requires, inter alia, that “Member States shall adopt all measures necessary to ensure that, before consent is given, projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location are made subject to a requirement for development consent and an assessment with regard to their effects.” Article 8 requires that “The results of consultations and information gathered pursuant to [the EIA process] must be taken into consideration in the development consent procedure”.

Schedule 3 to the Harbours Act 1964 incorporates the European Environmental Impact Assessment (EIA) Directive into UK law as respects applications for HROs. The Marine Works (EIA) Regulations 2007 (as amended) incorporates the Directive into UK law as respects applications for marine licences. The Directive aims to ensure that the authority giving the consent for projects is aware of any likely significant environmental effects before making its decision.

Paragraph 6 of Schedule 3 requires the MMO to inform the applicant of its decision in a case where the application is considered to relate to a project for the purposes of the EIA Directive. Furthermore, in such cases, the MMO is required to give an opinion as to the information required to be supplied in the environmental statement required to accompany the application under paragraph 8 of Schedule 3.

#### 1.2.2 EIA Screening and Scoping

Following receipt of the aforementioned notice of intended application, the MMO requested an EIA Scoping Report be provided in order that the MMO could undertake consultation to determine the scope of the EIA. The purpose of the report was to assist the MMO and its stakeholders to identify issues appropriate for inclusion within an ES.

Following completion of the exercise, the MMO provided a formal EIA screening and scoping opinion (included within Appendix 1.2 of this ES), stating the following:

*The proposed project is located within the West Wales Marine pSAC, which is being considered for designation as a Special Area of Conservation for the protection of harbour porpoise, Phocoena phocoena, which are susceptible to noise. Demolition and construction activities are likely to generate high levels of noise, as the works include the use of explosives for demolition, and piling.*

The works also involve land reclamation of approximately 1200 square metres. This could potentially lead to loss of habitat for fish spawning and nursery within that area.

It is therefore the opinion of the MMO that the proposed activity as described will have significant effects on the environment and is thereby screened into requiring an EIA under the Harbours Act 1964. Regard to the above points must be given when producing the subsequent Environmental Statement.

Under direction of the applicant, Stena Line, RPS have coordinated and prepared an ES in line with The Marine Works (EIA) Regulations 2007 (as amended) in respect of the proposed development.

In defining the scope of the ES and undertaking the EIA process, consideration has been given to matters identified within the MMO screening and scoping exercise, that is:

- Marine Mammals
- European Designated Sites;
- Birds;
- Marine Habitat;
- Methodology of Works;
- Invasive Species;
- Cumulative Impacts;
- Noise Disturbance;
- Historic Environment;
- Traffic;
- Operational Matters and Marine Navigation;
- Air Quality;
- Waste;
- Contamination;
- Alternatives;
- Visual Impact.

In considering the requirements for relevant matters to be addressed, a number of matters have been scoped out of the EIA process. Under the EIA Directive, *Human Health* and *Major Accidents or Disasters* could have been considered but these have been scoped out as they were not identified within the aforementioned MMO response and also for the following reasons: The proposed development has not been subject to a specific human health impact assessment due to the fact that the proposal seeks to replace an existing linkspan to facilitate ongoing operation of the existing ferry service and this topic has been scope out. It should however be noted that matters in relation to human health are considered within the ES in the context of noise, air quality and soils and contamination.

Similarly, in respect of major accidents or disasters given that the proposed development seeks only to facilitate ongoing operation of an existing service; this topic has therefore been scoped out.

## 1.4 ES Structure

The ES is comprised as follows:

- Non-Technical Summary
- Volume I - Main Statement
- Volume II - Figures
- Volume III - Appendices

Where figures referenced in the chapters of this ES are not located within the relevant chapter, they are provided in ES Volume II.

The ES comprises the following specific chapters:

- 1.0 Introduction
- 2.0 Project Description
- 3.0 Need for the Project and Alternatives
- 4.0 Coastal Processes

- 5.0 Flood Risk
- 6.0 Water Quality
- 7.0 Marine Biodiversity
- 8.0 Terrestrial Biodiversity
- 9.0 Transportation
- 10.0 Air Quality and Climate
- 11.0 Noise and Vibration
- 12.0 Waste Management
- 13.0 Soils and Contamination
- 14.0 Cultural Heritage
- 15.0 Landscape and Visual
- 16.0 Population and Human Environment
- 17.0 Interactions

## 1.5 Additional Statutory Consents

In addition to the requirement for an HRO, the proposed development has been considered in the context of other statutory consents which may be required prior to construction.

### 1.5.1 Marine Licence Context

The proposed development has been considered in the context of the Marine and Coastal Access Act (MCAA) 2009. The MCAA states it is a licensable marine activity to undertake a range of activities as defined by Section 66 of the Act, including:

- Deposition of any substance or object, in the sea or on or under the sea bed, from:
  - Any vehicle, vessel, aircraft or marine structure
  - Any container floating in the sea
  - Any structure on land constructed or adapted wholly or mainly for the purpose of depositing solids in the sea
- Construction, alteration or improvement works either in or over the sea or on or under the sea bed
- Use of a vehicle, vessel, aircraft, marine structure or floating container to remove any substance or object from the sea bed
- Carrying out any form of dredging, whether or not involving the removal of any material from the sea or sea bed

The MCAA defines 'the sea' as:

- Any area submerged at mean high water spring tide. This includes waters in any area:
  - That is closed, whether permanently or intermittently, by a lock or other artificial means against the regular action of the tide, but:
    - Into which seawater is caused or permitted to flow, whether continuously or from time to time, and:
    - From which seawater is caused or permitted to flow, whether continuously or from time to time
- The waters of every estuary, river or channel, as far as the tide flows at mean high water spring tide (MHWS).

In consideration of the above requirements outlined in the MCAA, the proposed development constitutes a licensable activity and as such, must receive a marine licence prior to commencement of works.

In preparation of the marine licence application, a formal screening opinion was sought on the need for an EIA in respect of the proposed development, in accordance with Part 2, Regulation 11 of the Marine Works (EIA) Regulations 2007 (as amended). The screening request was submitted to NRW in September 2017 (NRW reference SC1709).

NRW provided a formal response on 10<sup>th</sup> November 2017 stating the following:

*'It is our opinion that the works fall within the categories of project listed within Schedule A2, paragraph 63 and 69 of the above regulations, and therefore must be considered in terms of its size, nature and location having regard to the relevant criteria listed in Schedule 1 of the above regulations.*

*We have carefully considered the views of the consultation bodies alongside the criteria as set out in Schedule 1 of the regulations, and have determined, based on the information provided; that the project has the potential to have a significant effect on the environment and therefore a statutory Environmental Impact Assessment is required' (NRW, November 2017).*

Copies of the relevant correspondence between RPS and NRW, is included in Volume III, Appendix 1.3. In defining the scope of the ES and undertaking the EIA process, consideration has been given to matters identified within the NRW screening response.

A marine licence application has been submitted to National Resources Wales (NRW) accompanied by an ES, in February 2018 (NRW reference CRML1806).

### **1.5.2 Planning Permission**

Whilst the proposed development largely consists of works within the marine environment, consideration has been given to the proposal in the context of requirement for planning permission in line with the Planning (Wales) Act 2005.

An informal enquiry was made to the local planning authority, Pembrokeshire County Council, in respect of the project in May 2017. The Council confirmed by response that the proposal constituted permitted development by virtue of Class B of Part 17 of Schedule 2 of the Town and Country Planning (General Permitted Development) Order 1995 (as amended) and as such, no formal planning permission is required.

Copies of the relevant correspondence between Stena Line and the Council, is included in Volume III, Appendix 1.4.

In consideration of this, an application for a Certificate of Lawfulness shall be applied for to gain formal confirmation from the Council that planning permission is not required, in advance of works commencing.

## 2.0 PROJECT DESCRIPTION

### 2.1 Introduction

This chapter describes the proposed works to replace the existing linkspan and associated infrastructure at Fishguard Port.

The replacement linkspan berthing line and face is the same position as the current arrangement. The new area of reclamation and revetment is to the south of the replacement linkspan. Site location and proposed layout are shown in Figures 2.1 and 2.2 (See also Vol II) respectively.



Figure 2.1: Site Location (see also Volume II)

### 2.2 Proposed Development

The proposed development is located within Fishguard Port, a privately run Port, owned by Stena Line who operate a twice daily Ro Ro ferry service to Rosslare, Wexford.

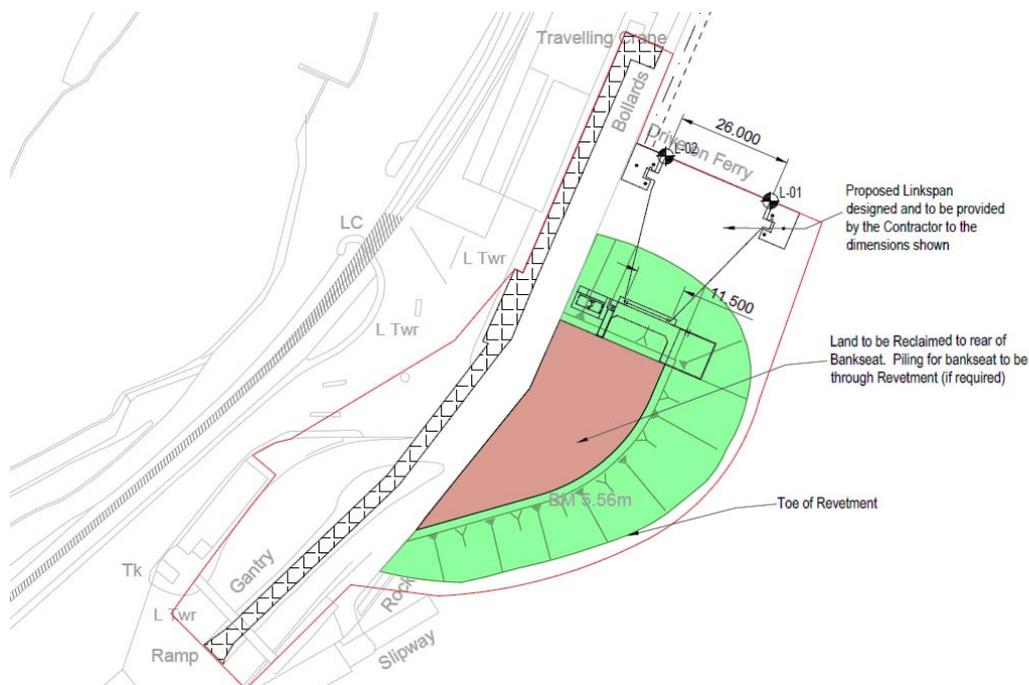
Access to the ferry is currently via a single lane linkspan, installed in the early 1970's supplemented by a temporary Jack-up structure. It is proposed to remove the existing Jack-up structure and its piles and the connecting linkspan ramp which is approaching its end of life and replace it with a modern linkspan. To facilitate access to the replacement linkspan, the existing open piled deck structure and dolphin are to be partially demolished and replaced with a reclaimed approach area to accommodate the new linkspan geometry. A new pavement will be constructed on this area of reclaimed land and faced on the seaward slope with a stone armoured revetment. The extent of the works will not exceed the boundary as shown on the drawings provided.

There are no plans to expand the ferry service within the Port; the upgrading of the facilities is to replace the existing linkspan and temporary Jack-up structure with a replacement linkspan designed to comply with modern standards, safety practices and reduced maintenance. This will ensure the service between Fishguard and Rosslare can continue to operate into the future without interruption.

The proposed development comprises of the design, manufacture, installation, testing and commissioning of a replacement single tier linkspan. All associated civil and marine works and infrastructure for the new linkspan are included within the scope of the project.

Key elements of the project include:

- The installation of a replacement single tier linkspan and associated civil and marine engineering works.
- Removal of existing Jack-up structure and existing linkspan ramp (See Figure 2.7)
- Demolition of existing concrete bankseat and dolphins, open piled deck (600-800m<sup>3</sup>) of reinforced concrete to be removed to facilitate construction of the new works. The concrete to be removed is all above the Mean Water Level. (See Figures 2.3-2.8 for details)
- All demolition works shall be carried by means of excavator mounted rock breaker, concrete sawing, or a combination of these methods; there will be no use of explosives/blasting.
- Dolphin construction and piling, if required
- Removal (dredging) of the soft sediments below the new area of reclamation. Soft sediments may be removed to landfill or if suitable reused for infill between the new revetment and the existing land; there will be no reuse of dredged materials within the marine environment, seaward of mean high water springs. No dumping of material at sea is proposed.
- A maximum of 10,000m<sup>3</sup> of material shall be removed which may include soft sediments or material suitable for reuse in the works as outline above.
- Revetment construction and reclamation including the return behind the bankseat (Green area shown in Figure 2.2). Up to 17,000m<sup>3</sup> of infill material to be placed on the seabed to construct the approach area, creating 1,200m<sup>2</sup> of new pavement construction (Shown in pink in Figure 2.2). The revetment will be approximately 100 m in length at the interface with the existing quay wall.
- Bankseat construction and piling, if required
- Heavy duty pavement construction and white lining 1,200m<sup>2</sup> of surfacing, including transition slabs connecting the new access to the existing internal roads of the Port
- Construction of steel walkways between dolphins
- Associated service connections and security



**Figure 2.2: Proposed Layout of Replacement Linkspan (see also Volume II)**

### 2.2.1 Scheduling of the Works

The proposed development includes two main elements of work; firstly the removal of the existing Jack-up structure including piles, linkspan ramp, associated mechanical infrastructure and the demolition of the concrete approach and support structures to facilitate the installation of the replacement linkspan. The proposed development minimises the amount of demolition required,

particularly below the water line. The Jack-up structure will be floated away for refurbishment and re-purposing at another port.

The second element of work includes all marine and civil works required to facilitate the installation of the replacement linkspan. This includes the construction of new dolphins and bankseat and the installation of the replacement linkspan. An area of land, immediately adjacent to the quay wall, will be reclaimed and faced with a rock armour revetment to replace the existing suspended approach deck. However the extent of revetment installed may be reduced by the use of a suspended deck, supported on piles, resulting in a maximum of 50 piles in the proposed development. The provision, installation and commissioning of the linkspan ramps and associated mechanical infrastructure will complete the project.

In order to minimise disruption to the existing ferry schedule, it is envisioned that reclamation works and enabling works for the construction of the dolphins and bankseat may be started prior to the suspension of ferry sailings from Fishguard Port.

The existing layout includes the following elements:



**Figure 2.3 Existing Open Piled Deck, Bankseat and Linkspan Ramp**



**Figure 2.4 Existing Bankseat**



**Figure 2.5 Existing Landside of Buffer Dolphin and Linkspan Ramp**



**Figure 2.6 Existing Seaward Edge of Buffer Dolphin Showing Forward End of Linkspan Ramp**



**Figure 2.7 Existing Jack Up Structure and piles**

### **2.2.1 Proposed Positioning of the Works**

The replacement linkspan will be located so that the berthing position of the vessel remains unchanged. This prevents the need to relocate services, the side access ramp, quay furniture, and negates dredging to the existing berth pocket. The new dolphins and bankseat will be positioned to avoid the existing mass concrete buffer dolphin. This also reduces the extent of the demolition required as the existing concrete buffer dolphin can be largely retained. The existing mass concrete foundations for the open piled deck will be within the reclamation area, and can remain in place, again reducing the amount of demolition required.

The proposed layout enables construction work to potentially commence on the dolphins and reclamation whilst the ferry service is still in operation. Demolition waste from the deck and dolphins may be reused as fill within the revetments and reclamation area if suitable; there will be no reuse of dredged materials within the marine environment, seaward of mean high water springs.

## **2.3 Elements of the Works**

The proposed layout for the replacement linkspan and associated civil work is shown in Figure 2.2 (see also Volume II).

### **2.3.1 Demolition and Site Clearance**

Demolition and site clearance will include the demolition of the existing open piled deck, bankseat and buffer dolphin, together with the disconnection and removal of the existing Jack-up structure, piles, linkspan and ramps.

The open piled deck, bankseat, and buffer dolphin will be demolished to a level where they will not interfere with the proposed new structures. The anticipated extent of demolition is shown in Figures 2.8 and 2.9 (see also Volume II).

The existing Jack-up structure will be disconnected and floated away from the quayside. The adjoining linkspan ramp will be disconnected, demolished and removed.

Where appropriate, the material generated from the removal of the linkspan infrastructure will be screened and re-used onsite, particularly within the proposed reclamation and revetment areas. All other material will be disposed offsite in accordance with all relevant statutory requirements and regulations. Demolition of the concrete structures will be carried out by means of excavator mounted rock breaker, concrete sawing, or a combination of these methods. The demolition will be carried out from the existing quayside, the partially constructed revetment, a jack up barge / pontoon or from a combination of all three.

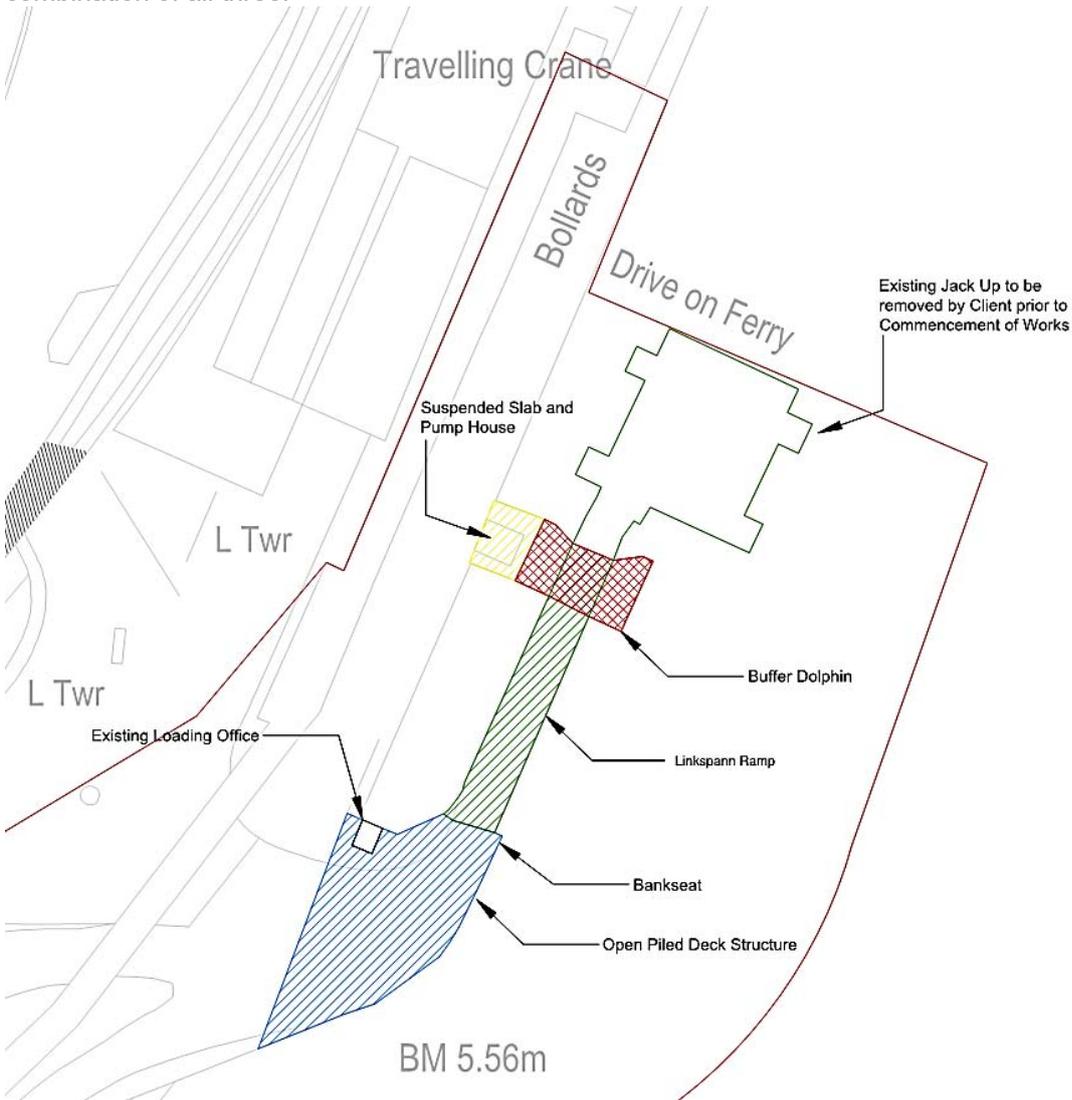
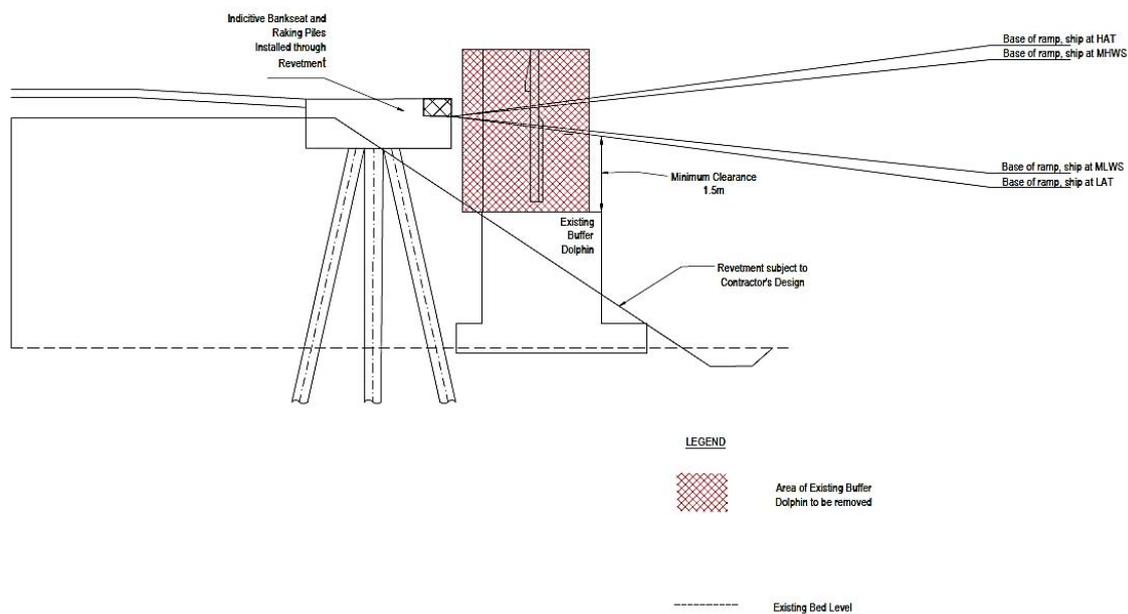


Figure 2.8: Areas to be demolished / removed (see also Volume II)



**Figure 2.9: Section through existing buffer dolphin and replacement linkspan ramp levels. Section of dolphin to be removed noted in red (see also Volume II)**

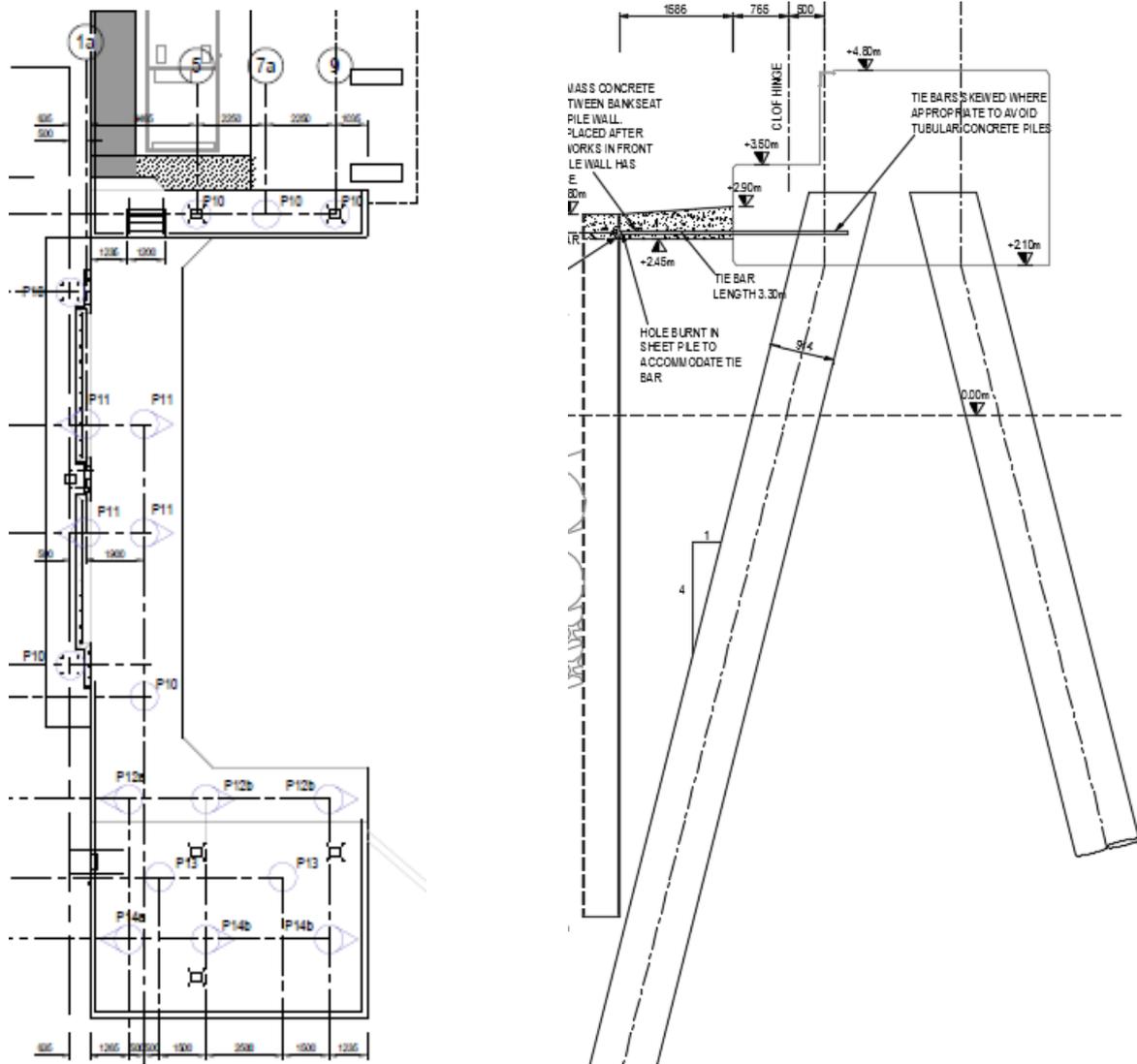
### 2.3.2 New Dolphins and Bankseat

Dolphins will be constructed adjacent to the edge of the replacement linkspan. They will be accessed by steel walkways, which will be constructed between the dolphins. The dolphins will support the new linkspan structure and facilitate the installation of the required mooring bollards and walkways.

A new bankseat will be constructed to the edge of the new reclamation area to the edge of the new linkspan. The bankseat supports the ramp section of the linkspan. Figure 2.10 outlines an indicative bankseat arrangement.

The new dolphin and bankseat structures will be supported by either tubular steel or concrete filled steel tubular piles (both raking and vertical piles) with a reinforced concrete pile cap. The number of piles and size of the reinforced concrete dolphins and bankseat will be determined during detailed design stage however, it is anticipated that a maximum of 50 steel tubular piles between 500 and 1100 mm diameter may be installed up to 12m into the underlying rock to support the dolphin and bankseat structures. Piling works will be carried out from the existing quayside, a partially constructed revetment, a jack up barge / pontoon or a combination of all three.

The dolphin structures will be constructed employing precast concrete shells as permanent formwork with in-situ concrete cast to complete the construction. Measures will be in place to prevent spillage of concrete during piling and concreting operations.



**Figure 2.10 Typical Bankseat Plan and Section, showing pile arrangement. The bankseat will be of similar construction to the dolphins.**

An indicative example of a linkspan is shown below in Figure 2.11.



**Figure 2.11 Typical linkspan**

### **2.3.3 Linkspan Construction**

The replacement linkspan will be operated hydraulically, and comprise of a steel deck supported at a low level by the bankseat structure and suspended on dolphins at the forward vessel end. The dolphins will also support the deck elevating mechanisms. It is anticipated that the linkspan ramp will be fabricated offsite and delivered for installation by ocean going barge or lifted off the delivery vessel by a floating crane. Once floated into position, the ramp is fixed at the bankseat at the rear of the ramp and connected to the hydraulic rams at the seaward end.

### **2.3.4 Linkspan Access**

Access carriageways shall be adequate to accommodate two lanes of traffic; the deck shall be two separate roadways each with a minimum clear width of 4.70 metres, in total 9.40 meters between parapets. The two roadways will converge just below the fixed ramp to form the linkspan ramp.

### **2.3.5 Walkways and Quay Furniture**

In addition to the vehicle lanes there shall be a walkway/service walkway of 1.50m free width at the quay side of the linkspan.

Hand-railing shall be provided to all accessible edges at the rear and along the sides of the linkspan, with the exception of the vessel ramp landing area which will have removable barriers comprising detachable uprights mounted in sockets in the deck with chains between.

Quay furniture will be provided to include new shore side bollards, general quayside furniture and safety equipment.

### 2.3.6 Dredging

Dredging will be carried out beneath the existing open piled deck and in the area of the reclamation once the deck has been demolished. This is to remove up to 10,000m<sup>3</sup> of soft material, to an anticipated maximum depth of 7m around the base of the columns of the deck structure and in the reclamation area prior to filling for reclamation. Dredging will be carried out by long reach excavator working from the shoreline and partially constructed revetment or operating from a barge / pontoon, depending on the position required. The flexibility in operation is required to accommodate the fact that piling and revetment construction will be ongoing in parallel with dredging. Dredge materials may be removed from site to a licensed facility or if suitable, reused within the works reused for infill between the new revetment and the existing land. There will be no reuse of dredged materials within the marine environment, seaward of mean high water springs.

### 2.3.7 Reclamation Area

The new approach area to the replacement linkspan will be constructed on the reclamation area, which will be bounded by a revetment. The new pavement formed from the reclamation area will be up to 1200m<sup>2</sup>. The reclamation area will be constructed by filling from the existing shoreline or from marine plant to create a revetment core; the area behind this revetment will be filled from the shoreline or from plant positioned on the constructed revetment core. The fill material used in the reclamation and revetment will consist of imported inert fill. Any dredge material deemed suitable for use within the reclamation will not be placed within the marine environment, seaward of mean high water springs. Demolition material may be beneficially reused within the reclamation area if suitable. Fill material is to be placed and compacted up to the rear of the revetment where it meets the existing quayside, and a pavement constructed up to finished level.

### 2.3.8 Revetment

A rock armour revetment is to be placed to the seaward edge of the reclamation area; it is to be constructed from imported inert stone. Rock armour to the front of the revetment will be placed by land side machinery from the newly reclaimed area.

Foundations for barriers or fencing at the edge of the rock armour revetment will be precast, lifted into position and placed behind the rock armour and backfilled. The revetment will be constructed to the shore side of the reclamation area, with a maximum slope of 1:1.5. Geotextile membrane will be laid under the fill and rock armour material as part of the revetment construction. The maximum anticipated length of the revetment (measured along the seaward edge of the pavement at the head of the rock armour revetment) is 120 m with a maximum anticipated rock armour stone size of 3 tonne. The revetment will be approximately 100 m in length at the interface with the existing quay wall.

### 2.3.9 Surfacing

Following the installation of any service ducts or pad foundations for barriers, lighting or fencing, the reclaimed land will be paved with a heavy duty pavement, to provide an access area for the new linkspan, increasing the space available to traffic. Transition slabs may be required at interface of the reclaimed area and the existing slab, and the reclaimed area and the ramps to the replacement linkspan.

### 2.3.10 Foul & Storm Water Drainage

Storm water runoff from the site will be collected in the current dedicated storm water drainage system at the Port. The storm water drainage system will collect rainwater incident upon the site for discharge to the Port waters via a series of interceptors.

The existing building structures and toilet facilities will remain unaltered during these works and no foul sewerage infrastructure will be modified.

### 2.3.11 M & E Services

The existing site connections will be employed for the replacement linkspan.

Water supply will be unaltered unless diversions are required. No new connection to the local mains system will be required for these works.

Where required to replace or supplement existing lighting, lighting will be designed to provide an average lighting level of 30-50 lux. The lighting will be designed employing directional lighting and low intensity luminaires to minimise light pollution to local residents. The same approach will be applied to the Construction phase of the works.

Any localised additional lighting will to be connected to the existing electrical supply / system within the Port.

### 2.3.12 Fencing & Security

Palisade fencing will be provided around the boundary of the proposed reclamation area to comply with the requirements of the International Ship and Port facility Security Code (ISPS). The fencing will be painted to suit the existing fencing in the Port. Security gates will be positioned along the fence where required. CCTV and security services will be relocated and upgraded if required to allow sufficient coverage of the new facilities. The exact position of these will be determined in consultation with Stena Line and the Harbour Master at fit-out stage.

## 2.4 Construction Activities

### 2.4.1 Working Hours

The Port currently operates 24 hours per day. During the proposed construction, working hours will be:

- Monday to Friday – 07:00 to 19:00 hrs;
- Saturday – 07:00 to 13:00 hrs.

No significant construction noise activities shall be permitted outside of these hours except as necessary for operational or safety reasons.

It is anticipated that Port operations will continue during the initial construction works, but Ferry operations shall be suspended prior to commencement of the demolition works and during the installation of the replacement linkspan.

### 2.4.2 Construction Sequence

#### 2.4.2.1 Construction Sequence - During Ferry Operations

Piling works, or other foundation installation works for the dolphins, or shoreside edge of the bankseat may be carried out while the ferry is still operational. These works shall be undertaken only if they will not impede the ferry operations. It is anticipated that this work may be carried out by marine plant for the seaward dolphins. However, the remainder of the piling may be carried out using land based plant from the newly constructed revetment. Filling works for the reclamation may start during this period, and will form an access for piling plant. Filling may be carried out from marine or land based plant.

#### 2.4.2.2 Construction Sequence – While Ferry is offline

The majority of the works will be carried out whilst the ship is offline. The removal of the existing linkspan and ramp, to allow for the demolition of the buffer dolphin and the existing piled concrete deck. The jack up pontoon and piles will be removed by the client immediately following the suspension of the ferry operation of the ferry schedule.

The buffer dolphin will be demolished to below the base of the bankseat, to a level that will not interfere with the proposed linkspan ramp at any stage of the tide, inhibit the construction of the new structures, or interfere with any future vessel movements within the Port. The access ramp from the rear dolphins will span over the foundations of the existing buffer dolphin.

The existing piled concrete deck will be demolished down to Mean Water Level. The demolition for both the deck and the buffer dolphin may be carried out by means of excavator mounted rock breaker, concrete sawing, or a combination of these methods. Any soft material will be removed; prior to the filling of the reclamation or displaced to the edge of the revetment during filling and removed by excavator. Suitable material will be reused as fill in the reclamation area however there

will be no reuse of dredged materials within the marine environment, seaward of mean high water springs. All other material will be disposed offsite to a suitably licensed site.

Once the demolition of the existing piled deck is complete down to the desired levels, any structure remaining will be encompassed within the reclamation. Filling will continue to the reclamation and the revetment formed, which is faced with rock armour. The material for the main infilling of the reclaimed area will be of suitable imported fill material as noted previously. The rock armour revetment will typically comprise of a rockfill core faced with rock armour, with side slopes typically sloped at 1:1.5. Once the reclamation is complete to the correct level the pavement can be constructed. Installation of transition slabs and/or re-grading of the existing surfacing will be carried out during the construction of the new surfacing.

The rear bankseat piles and structure can be installed and constructed using plant positioned on the new reclaimed land and pavement. The concrete structures may be precast or constructed insitu.

The replacement linkspan will be delivered to site by sea as one unit for installation. In conjunction, it is envisaged that the ramps and pedestrian walkways will be constructed and connected to the replacement linkspan. These may be brought to site by road or sea.

The programme below is indicative only, and will be confirmed once a contractor is appointed. The construction programme can be forwarded on request when available.

Sept 2018

- Mobilisation to site

Sept 2018 – January 2019 (work carried out while ferry operation is still ongoing)

- Dredging operations, using long reach excavator from either the existing open piled deck or from floating plant. Dredge material stored on site temporarily and removed to landfill. (Sept 2018 – January 2019)
- Reclamation and revetment construction commences, imported inert stone placed using long reach excavators. (Sept 2018 – Feb 2019)
- Piling for bankseat and dolphin structures from marine or landside plant (Marine installation Sept 2018 – Feb 2019) (landside plant installation Sept 2018 – Feb 2019)
- Precast concrete structure installation, and insitu concreting landside plant (Feb 2019)

February 2019 – May 2019 (work carried out when the ferry operation is suspended)

- Removal of existing jack up pontoon (March 2019)
- Reclamation and revetment works, imported inert stone placed using long reach excavators. (February 2019 – May 2019)
- Demolition of Linkspan (February 2019 – April 2019)
- Demolition of existing concrete structures (February 2019 – April 2019)
- Piling works from marine or landside plant (February 2019 – April 2019)
- Paving of reclamation area (March 2019 – April 2019)
- Installation of Linkspan steel structure (April 2019 – May 2019)

### 2.4.3 Temporary Site Compound

An area will be required for the establishment of the appointed Contractor's site compound. The site compound will be used for the appointed Contractor's site office accommodation and facilities and will include an area for temporary storage of construction materials. Two potential areas have been identified in Figure 2.12 below (see also Volume II).

#### 2.4.3.1 Area 1

It is likely that this will be provided on the eastern edge of the Terminal area. The area is currently in use as a car parking area for staff and passengers. This is noted as proposed Area 1 in Figure 2.12 (see also Volume II).

It is envisaged that this area could be used throughout works for site cabins, parking.

### 2.4.3.2 Area 2

A second area, a large area of gravel topped pavement on the north end of the Port which is currently in use for overflow parking for trailers and machinery could be utilised. This area is proposed to be used for parking, site cabins and storage of materials.



**Figure 2.12: Fishguard Port Potential Temporary Contractor Site Compound Areas (see also Volume II)**

### 2.4.4 Site Access

It is envisaged that with the exception of ferry operations, other port activities will continue to operate throughout the works. This includes the RNLI and any other small craft which regularly use the Port.

The appointed Contractor may start on site prior to the cessation of the ferry operations, which will coincide with the commencement of the demolition. The period between the start of the demolition and the commissioning of the replacement linkspan, and thus re-commencement of the ferry services is scheduled to be approximately 3 months.

Access to the site will be via Station Hill roundabout which can be accessed at Quay Road from Goodwick in the West or via the Parrog/A40 from Fishguard town in the East. Construction related traffic will use the Stena Line Ferry Terminal entrance road via Station Hill which is accessed from the main centre of Fishguard. Construction traffic is most likely to arrive from Fishguard town direction, as it is the main commuter road from inland cities and towns within Wales.

Suitable traffic management and other systems will be put in place as required to minimise disruption to existing activities within the Stena Line Port during the construction period.

The town itself should not be majorly affected by construction traffic; however shipping and fishing vessels may be interrupted occasionally during the construction work.

## 2.5 Construction and Environmental Management

### 2.5.1 Pollution Control

The construction works will involve Civil and Marine Engineering works and Mechanical and Electrical works.

All machinery used during the construction phase of the works will be required to be in good working order and free from oil and hydraulic fluid leakages. If machinery maintenance has to take place, it will be carried out at the appointed Contractor's compound which will be located away from the adjacent Port waters. Fuel for machinery will be required to be stored in a secure and bunded area.

No losses of concrete (cement) to the Port waters will be permitted during this phase of the works.

### 2.5.2 Site Safety

Safety will be of prime importance during the construction works. The works will be subject to the CDM Regulations 2015 and the Health and Safety at Work Act 1974.

All aspects of design and construction will be reviewed with regards to health and safety, risk assessments will be carried out. The principle contractor will be appointed to produce a pre-tender Construction Phase Plan for the project. The principal contractor will be responsible for planning, management; monitoring and coordination of health and safety in the construction phase the project.

### 2.5.3 Waste Disposal

Appointed Contractors working on site during the works will be responsible for the collection, control and disposal of all wastes generated by the works. An indication of the types of waste likely to be generated by the works and the most appropriate method of disposal are presented in Table 2.1 below.

**Table 2.1: Waste generated by Construction Works**

Activity	Waste Generated	Disposal/Treatment Recommendations
General Construction Waste	Demolition Waste, Reinforced Concrete	Off site if not possible to reuse within the reclamation area
	Waste oils	Collected by waste recycling contractor
	Other waste	Collected in skips for disposal by licensed waste contractor.
Dredge Material	Silts and sands	Off site to suitable landfill (if not reused)
General Office	Paper, packaging, canteen etc.	Collected in covered skips/large bins for disposal by a licensed waste contractor.
Temporary Site Toilets	Sewage	Emptied under contract for disposal at an appropriate facility.

## 2.6 Operational Activities

### 2.6.1 Use of the Linkspan

The construction of the replacement linkspan and supporting infrastructure will replace the facilities currently provided within the Port.

### 2.6.2 Maintenance

When construction work has been completed, the replacement linkspan will require minimal maintenance.

It is anticipated that existing regular maintenance dredging activities will continue as normal.

Maintenance dredging may need to be carried out during construction, but is likely to be carried out as part of Stena Line's regular maintenance dredging programme.

### 2.6.3 Pollution Control

Surface water from the main bankseat deck and working areas will be collected by a system of drainage channels and gullies. The surface water will be discharged to sea via interceptors to ensure that no pollution is released into the Port or surrounding waters. The hydraulic systems associated with the operation of the linkspan will comply with all relevant standards.

#### 2.6.3.1 Waste Disposal from Vessels

The Port Authority operates an Environmental Management System (EMS), which includes procedures for the disposal of waste from berthed vessels.

All waste to be disposed of from berthed vessels will be handled and disposed by a licensed waste disposal contractor. Waste awaiting disposal will not be permitted to be stored on the quayside.

Discharges from vessels to the Port waters will not be permitted.

### 2.6.4 Marine Navigation

The proposed development does not require any change to the existing marine navigational arrangements as there are no changes proposed to the existing ferry operations.

Discussions have been undertaken between the applicant, Stena Line and the Fishguard Port Harbour Master with a view to undertaking regular reviews (including prior to commencement of construction) of the existing port navigational aids in line with the requirements of the Port Marine Safety Code 2016 and associated Guide to Good Practise on Port Marine Operations 2018. Fishguard Port as a local lighthouse authority will always exercise its functions in accordance to the Ports Safety Management System.

The existing provision and level of navigational aids provided are based on a formal risk assessment. The characteristics and availability of all aids to navigation comply with internationally agreed guidelines, applied in conjunction with the General Lighthouse Authority.

If during the temporary construction phase, and if deemed necessary, the Harbour Master may carry out a dynamic Marine Navigation Risk Assessment using the Port Safety Assessment Toolkit MarNIS; this assessment will be carried out in consultation with other port users. The MarNIS Navigation Risk Assessment will determine the control measures, if any, necessary which may include the installation of temporary navigation marks, marine safety broadcasts and associated notices to mariners.

## 3.0 NEED FOR THE PROJECT AND ALTERNATIVES

### 3.1 Need for the Project

As stated in Chapter 2 Project Description, the proposed development is located within Fishguard Port, a privately run Port, owned by Stena Line who operate a twice daily Ro Ro ferry service to Rosslare, Wexford. Access to the ferry is currently via a single lane linkspan (access ramp to ship, from fixed land side structure), installed in the early 1970's supplemented by a temporary Jack-Up structure. This existing linkspan is approaching its practical end of life and it is proposed to install a replacement linkspan and associated civil and marine infrastructure to allow the continuation of ferry services from the Fishguard Port.

To facilitate access to the replacement linkspan, the existing open pile deck structure and dolphin are to be partially demolished and replaced with a reclaimed approach area constructed to accommodate the replacement linkspan geometry. A new pavement will be constructed on this area of reclaimed land and faced on the seaward slope with a stone armoured revetment. The associated upgrading of the facilities is to replace the existing linkspan and temporary Jack-Up pontoon with a new two lane linkspan and approach structure designed to comply with modern standards, safety practices and reduce maintenance levels.

The existing linkspan is used twice daily to support the ongoing ferry route; the need for the project is established in terms of continuing to operate the ferry route from the Port.

### 3.2 Assessment of Alternatives

Relocating the existing service to an alternative port or developing an entirely new port, were ruled out at the outset of the design process, on the basis of a number of critical factors, including impact on the existing port and surrounding area, availability of site, associated infrastructure requirements, cost and operational limitations. As such, consideration was only given to design options which would permit the continuation of the ferry service, within Fishguard Port.

An initial assessment of the existing linkspan and the approach structure was carried out to determine if the existing structure could be refurbished. This was ruled out for several reasons;

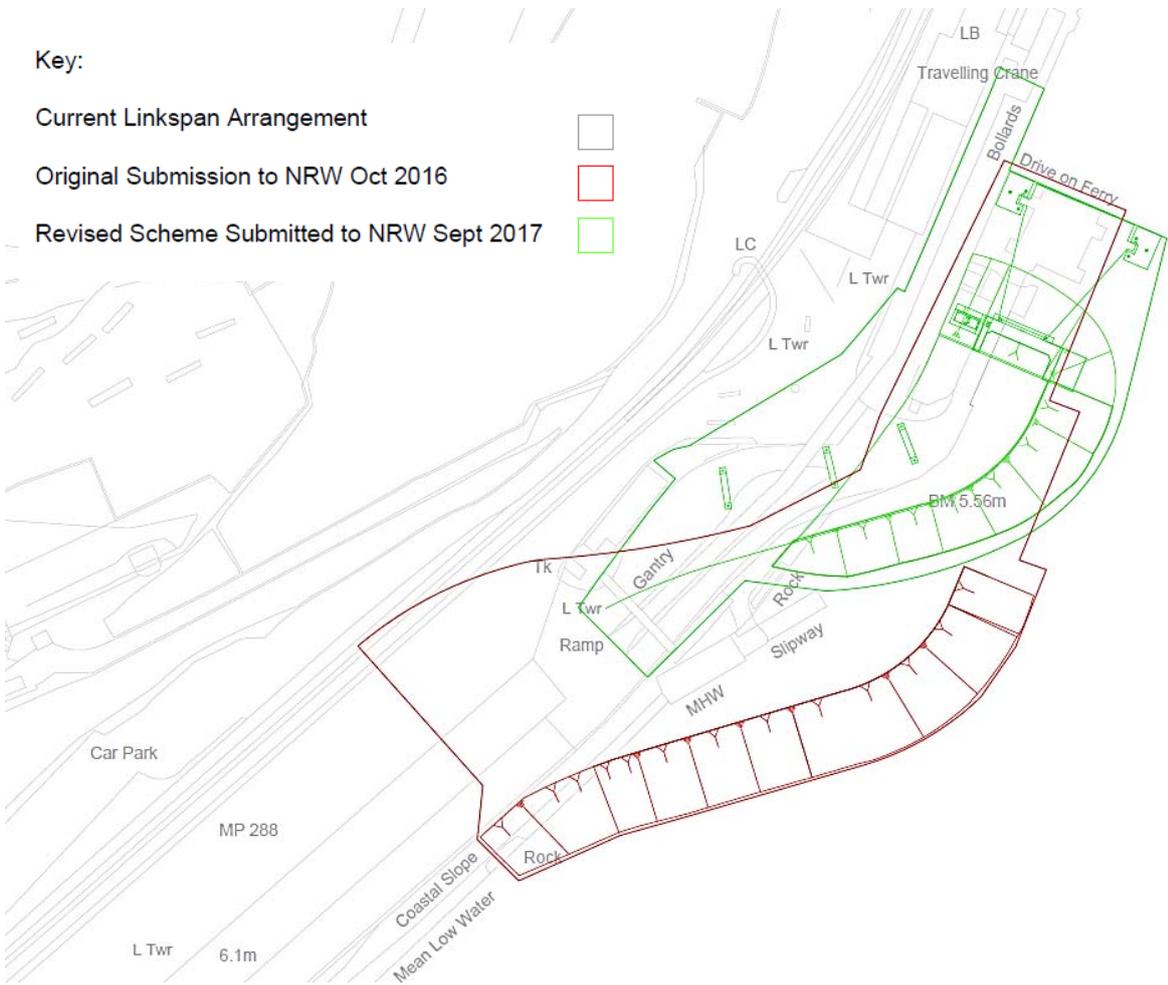
- The existing linkspan and approach structure is approximately 45 years old which is approaching its potential design life of 50 years.
- The structure is classified under maritime rules and requires ongoing certification which requires increasing amounts of work and poses a risk to continuing operations (in terms of failure to obtain certification)
- The Jack-Up structure has been employed to improve the access to the ship due to the narrow width of the original linkspan.
- The existing linkspan is of a single lane configuration which is not the optimum arrangement for efficient and safe Ferry operations.

It was considered that replacement of the existing linkspan was a better solution in terms of long term sustainability of the ferry operations.

Relocating the linkspan and approach structure to another area along the quay face was also considered however this was ruled out for the following reasons;

- The current position of the existing linkspan is aligned with the side loading ramp, positioned to match the *Stena Europe* (vessel currently operating on the route). Changing the position of the linkspan would have required the redevelopment of the side loading ramp and other associated infrastructure.
- The current arrangement of the landside access and queuing lanes are configured to accommodate the current location of the existing linkspan; a more extensive redevelopment of the Port would have been required to suit an alternative linkspan position.
- The positioning of the replacement linkspan behind the existing structure would have required significantly more dredging and the construction of a new quay wall to accommodate the new location.
- Potential for greater environmental impact at the new location than re-using the site of the existing linkspan.

In addition, a larger revetment footprint / alternative design was submitted for scoping with NRW (NRW Ref: SC1605) / October – Dec 2016; following this process, the proposed project now submitted has a smaller footprint than the previous design as indicated in Figure 3.1 below.



**Figure 3.1 Comparison of Alternative Revetment Designs**

It was concluded, following these assessments that the preferred location for the replacement linkspan is at the location of the existing linkspan and when combined with a reduced footprint, produced the least impact on the surrounding environment and infrastructure.

## 4.0 COASTAL PROCESSES

The coastal processes affecting the site of the proposed replacement linkspan have been assessed using computational modelling techniques based on the Mike coastal process software which has been developed by the Danish Hydraulics Institute. The modelling included the simulation of the wave climate and tidal flows over the approaches to Fishguard harbour as well as within the harbour and at the Port itself. The bathymetry for the hydraulic models has been taken from data supplied by the UK Hydrographic Office under the EU INSPIRE project, digital bathymetry supplied by C-Map of Norway together with the latest hydrographic surveys within the port.

The wave climate at the site of the replacement linkspan has been simulated using a combination of the spectral wave energy model, Mike21 SW and the harbour disturbance, Mike21 BW. The wave climate approaching Fishguard from the south west approaches and the Irish Sea was simulated for 1 in 1, 1 in 50 and 1 in 100 year return period storms from directional sector south south west to north east using the spectral wave generation and transformation model, Mike21 SW. This model was also used for the generation of wind waves across the local fetches from the east and east south east. The wave conditions around the harbour were then simulated using the Boussinesq wave disturbance model, Mike 21 BW.

Waves which approach the breakwater are diffracted around the end of the breakwater and approach the site of the linkspan from an easterly sector. During a 1 in 50 year return period storms from the northerly sector the waves approaching the linkspan will typically have significant wave heights of about 1 metre with peak energy wave periods of about 9 seconds. Although waves approaching the linkspan from the east and east south east they will also have wave heights of about 1 metre during the equivalent return period storms, the peak energy wave periods will be in the range of 2.4 to 3.1 seconds so the disturbance will be of a short steep wave.

The tidal range at Fishguard varies from about 4.0m at springs to 1.4m at neaps. The tidal flow regime around the harbour has been simulated for a series of typical spring tide using the Mike21 FM flow model. Tidal currents at the linkspan site are extremely weak with peak current speeds of less than 0.05 m/s. The tidal flow will generally be in a south/south-westerly direction for the majority of the tidal cycle.

During northerly storms and particularly during the flood tide, there will be a tendency for there to be a general clockwise circulation round the bay due to the presence of the breakwater. However, around the linkspan site area the currents are so weak and the wave climate so benign that there will be very little sediment movement due to the coastal processes. As can be seen from the bathymetry of the sea bed of the harbour around the linkspan, the most significant impact on the seabed sediment regime comes from the movement of ships on and off the berth, particularly at times of low water when the ships propulsion systems can stir up and redistribute fine sediment.

The replacement linkspan is effectively on a "lee shore" during significant wave events thus the proposed development will have no significant impact on the wave climate in the remaining parts of the harbour or its adjoining areas. The proposed replacement of the open piled approach ramp with a rockfill reclamation area, complete with wave absorbing revetments, will marginally improve the wave reflections in the immediate area around the linkspan.

The impact of the proposed development on the tidal regime has been simulated by rerunning the spring tide tidal simulation with the proposed replacement structures in place. The impact on the flow regime has then been assessed by means of difference plots, proposed minus existing. As expected with such a small change in the footprint of the harbour there was no detectable change in the tidal elevation in the harbour

In view of the fact that there is no significant change in either the wave climate or the tidal regime due to the proposed development it is concluded that there will be no significant change in the sediment transport regime of the harbour or its adjoining areas.

The suspended sediment concentration only exceeds 20 mg/l in an area around and to the south west of the proposed reclamation area and even then it only exceeds 20 mg/l for relatively short period of time.

Silt lost to the water column will be deposited mainly within the reclamation area with only a minor depth of circa 2.5mm in a restricted area along the sea wall to the south west of the proposed development.

Thus the maximum excursion of the finest particles in the rockfill will be less than 20 metres before they reach the sea bed. Thus any wash out from the rockfill reclamation material is likely to settle on the sea bed within 20 metres of the reclamation footprint.

Due to the very low current speeds at the site of the proposed development other construction activities such as piling will not have any significant impact on the waves, tides or sedimentation processes.

The possibility of significant effects of the proposed replacement linkspan acting cumulatively or in-combination with the consented Fishguard Harbour Marina Development, was considered in this assessment. Having reviewed the Hydrodynamics and Geomorphological assessment of that EIA, there is not likely to be any significant cumulative or in-combination effect on coastal processes as a result of this proposed replacement linkspan when considered along with the consented marina development.

The modelling and studies for the coastal processes have shown that the proposed replacement linkspan at Fishguard will have no significant impact on the coastal process away from the immediate area around the site. The impact of the construction activities such as dredging of silt from the foundation area for the rockfill embankment and the placing of the rockfill itself will result in small localised temporary increase in suspended sediments concentrations around the site area on the western side of the harbour. However, there will be no significant impact on sedimentation within the harbour away from the immediate area surrounding the site.

## 5.0 FLOOD RISK

The assessment was carried out in accordance with Planning Policy Wales Technical Advice Note 15 (TAN 15) Development and Flood Risk. A key requirement of TAN15 is that a Flood Consequence Assessment (FCA) must be produced for any development at risk of river or coastal flooding. The results of the FCA should be used to inform the final design of a development and to demonstrate that all risks have been identified and appropriately mitigated. This is vital to ensure that the proposed development will be safe for people to live in or use for all of its proposed lifetime.

The three development advice zones are identified on the Development Advice Maps published by Natural Resources Wales. The maps are based on the best available information considered sufficient to determine when flood risk issues need to be taken into account in planning future development. The map shows that the proposed development lies within Zone C.

Particular flooding consequences may not be acceptable for particular types of development. The precautionary framework in TAN15 identifies the vulnerability of different land uses to flooding, and for this purpose development has been sub-divided into three categories- highly vulnerable, less vulnerable and emergency services. Paragraph 5.3 of TAN 15 states '*there are uses which are considered to be exceptions the general rule and have not been classified in the table, because they are required to be in a fluvial, tidal or coastal location. These include boatyards, marinas, essential works required at mooring basins, and development associated with canals*'. Replacement of the Linkspan can be considered under this category. These developments are not subject to the first part of the Justification test in Section 6 of TAN15 but are subject to the acceptability of consequences part of the test as listed below:

*'development will only be justified if it can be demonstrated that:*

- iv. The potential consequences of a flooding event for the particular type of development have been considered, and in terms of the criteria contained in Sections 5 and 7 and Appendix 1 found to be acceptable'.*

The potential sources of flood risk have been identified based on the flood maps published by Natural Resources Wales. RPS have assessed the flood risk to the proposed development and determined the predominant source of flood risk emanates from extreme tidal events from Cardigan Bay.

If a development proposal in Zone C1 or C2 is defined as being of low vulnerability and meets the Development Justification requirements, whether or not the development should proceed will depend on whether the consequences of flooding can be managed to an acceptable level.

The proposed development because of its nature requires a waterfront location. There is an existing linkspan in place and the site currently operates in a similar manner, so the flood risk exists at present. The proposed development must be set at specific levels to enable access from the quay to the ship. Existing levels are approximately 5.3m OD at the open deck, sloping to around 5.0m OD at the linkspan. The new pavement/top of the revetment will tie in with these existing levels. These levels are below the 0.5% AEP level of 6.52m OD that should be considered including climate change. Mitigation measures are therefore required to manage the consequences of flooding to an acceptable level.

Storm water runoff from the site will be collected in the current dedicated storm water drainage system at the Port. The storm water drainage system will collect rainwater from the site for discharge to the Port waters via a series of interceptors. There is therefore no increase in storm water runoff to the Port as a result of the proposed development.

The proposed development will not have an impact on flood risk elsewhere, as it is a waterfront development built within the existing harbour to replace an existing linkspan arrangement.

If an extreme event is forecast, any sailings from the Port are likely to be cancelled meaning that the replacement linkspan will not be in operation so there will be no risk to life. The entire Port area will be at risk so it is likely to have been closed and evacuated in accordance with any existing emergency plans. There will be no damage caused to the replacement linkspan if it is flooded, and there will be no major clean up required. No further mitigation measures are therefore proposed.

These mitigation measures ensure that the proposed development is as safe as possible and there is:

- minimal risk to life;
- minimal disruption to people working in the area;
- minimal damage to property;
- minimal impact of the proposed development on flood risk generally; and
- minimal disruption to natural heritage.

The main residual risk is for coastal flood events in excess of the design conditions. It is assumed that, given their severity, sufficient warning will be given to evacuate the area.

Following this assessment the consequences of flooding resulting from this development proposal are considered to be acceptable, therefore meeting the PPW TAN 15 flood risk and development requirements.

## 6.0 WATER QUALITY

The potential impact of the proposed replacement linkspan at Fishguard Port on the water environment has been assessed through the characterisation of the baseline environment and an assessment of the potential changes on the water quality status of the relevant water bodies in the context of the Water Framework Directive (WFD).

The location of the proposed development lies within Cardigan Bay South coastal water body (GB621009580000) in the Western Wales River Basin District (WWRBD) which is a large Coastal water body currently at good water quality status. The water body has an intermediate tidal range, where the difference in height between consecutive high and low waters is between 1 and 5 metres. The water body is currently achieving the WFD objectives for water quality (i.e. to achieve at least / maintain good status by 2021). The proposed development has been assessed with due consideration to this objective as the replacement linkspan must not compromise the quality of the different elements (biological and chemical) contributing to the surface water status of the water body thereby ensuring no deterioration in water quality.

Cardigan Bay South is considered to be a feature of extremely high importance as sections of the water body are protected by EU legislation, i.e. Natura 2000 sites (European Sites). Possible effects on European sites are discussed in the Marine Biodiversity assessment.

The key issues identified with regard to water quality are associated with the physical disturbance in the marine environment and adjacent lands due to demolition and construction activities and the required removal of waste materials off-site. The potential impact arising from the physical disturbance includes sediment, concrete or fuel/chemicals entering the Harbour. During the operational phase the potential for the development to impact on coastal processes and morphology of Fishguard Harbour is considered; additional pressures associated with sewage, storm water drainage and accidental spillages potentially impacting on water quality were also assessed.

Mitigation has already been undertaken during the design phase of the proposed development to minimise the potential impact of the project on the water environment. Sensitive design of this development has been undertaken to result in least possible loss of habitat, and disruption to the coastal processes has been minimised therefore there will not be a significant change to the physical processes within the Bay.

Mitigation and control measures to address the impact from suspended sediments, concrete and the use of oil and chemicals associated with construction activities, including dredging, will follow best practice guidance and sound design principals across the entire construction site, i.e., immediate working area; storage areas and car parking facilities; security building and; associated road access.

The Port Authority operates an Environmental Management System (EMS) for the Port's operational activities, the environmental controls contained within the EMS will be applicable to the development and ensure water quality is not impacted during the operation of the replacement linkspan.

The mitigation outlined in the Water Quality chapter were informed by the WFD objectives and the need to ensure that the development does not compromise the achievement of the Cardigan Bay South coastal water body, as defined in the "*Western Wales River Basin Management Plan: 2015-2021*". The impacts outlined above and the mitigation measures proposed have informed this assessment in addition to the consideration of potential cumulative impacts with other developments within the area. The mitigation strategy proposed will ensure any potential impacts are not significant and the construction and operation of the replacement linkspan will not compromise the achievement of the WFD objectives for Cardigan Bay South coastal water body.

No significant water quality impacts have been predicted.

## 7.0 MARINE BIODIVERSITY

The marine biodiversity chapter provides an assessment of the potential significant effects of the proposed development on marine ecology receptors (benthic habitats and species, plankton, fish and shellfish and marine mammals). The assessment considers a development scenario involving both reclamation and piling and also a development scenario involving piling only.

Project specific marine ecology surveys found the intertidal foreshore within the development footprint to be characterised by a range of commonly occurring rocky shore species. The habitat within the shallow subtidal consisted of large boulders and other hard substrate with fronds of kelp other marine algae attached. The subtidal sediment habitat in the survey area consisted of slightly gravelly sand and muddy sand. This habitat was characterised by a range of taxa with the most abundant species including polychaete worms, bivalve molluscs and brittlestars.

The West Wales Marine candidate SAC (cSAC) is the only international nature conservation designation that overlaps with the proposed development footprint. In addition, a number of other internationally designated sites in the wider area have mobile marine features that could be potentially affected by the development. Other mobile species in the local area include grey seal, bottlenose dolphin and migratory fish (including Atlantic salmon, European eel and lamprey species).

The key impact pathways scoped into the marine ecology assessment were:

### **Direct Loss of Benthic Habitats and Species as Result of the Works**

The reclamation and revetment will result in the physical loss of 0.34 ha of marine habitat in which approximately 0.04 ha consists of intertidal rocky shore habitat with the remaining habitat consisting of subtidal habitat. The footprint off habitat loss is considered negligible in the context of extent of the overall amount of similar marine habitats found locally in Fishguard Harbour. In addition, most of the habitats and species recorded are generally considered commonly occurring and are not listed as nationally rare or protected under conservation designations. However, small areas of habitat characteristic of the BAP/NERC Act 2006 Section 42 habitat 'Intertidal Underboulder Communities' were recorded in the footprint (approximately 0.009 hectares (ha)). The impact of direct habitat loss as a result of the reclamation to this habitat is considered to be moderate to minor and the impacts to marine habitats more generally are considered minor to insignificant. In order to reduce the significance of the impact on the BAP/NERC Act Section 42 'Intertidal Underboulder Communities' characteristic habitat, suitable boulders should be placed on the bottom of the rock revetment at lower shore elevations similar to those lost as part of the reclaim. With this mitigation measure in place the impact on this habitat is considered to be insignificant. The piling only scenario will result in a smaller loss of marine habitat than the reclamation scenario (<0.005 ha). The impact of this highly localised, negligible loss is considered to be insignificant.

### **Direct Changes to Benthic Habitats and Species as Result of the Dredging**

The footprint of dredging covers a very localised area which is already subject to high levels of physical disturbance from vessel related disturbance as a result of adjacent maintenance dredging works and the commercial use of Fishguard Harbour. The impact is therefore considered to be insignificant.

### **Smothering During Construction**

The small amount of dredging required as part of both development scenarios is only predicted to cause highly localised deposition of sediment which will be barely measurable against background variability. The impact is therefore considered to be insignificant.

### **Changes in Water Quality During Construction**

The dredging plume is only predicted to cause a negligible, temporary and localised increase in suspended sediment concentrations as part of both development scenarios. In addition, the overall level of contamination in the proposed dredge area is low and the extent of sediment dispersal as a result of the dredge is considered to be spatially limited. Significant elevations in the water column contamination are therefore not anticipated. Marine ecology receptors are not considered sensitive to the scale of change predicted and the impact is considered to be insignificant.

### **The Potential Introduction of Non-Native Species during Construction**

In view of existing and near future commitments and considerations, the probability of the introduction and spread of non-native species from construction works is considered to be low and the overall

impact insignificant for both development scenarios. However, in order to manage potential non-native species risks as a result of the works a Biosecurity Plan will be produced.

#### **Indirect Changes In Habitat Extent And Quality as a Result of the Replacement Linkspan**

The replacement linkspan is expected to cause a marginal change in flow speeds away from the immediate area of the proposed replacement linkspan. Such changes are unlikely to result in any significant changes to local sediment transport in the region. Only localised and negligible changes in wave climate were also predicted. Given these highly localised and small scale predicted effects on the hydrodynamic and sedimentary processes, the impact on intertidal and subtidal species is considered to be insignificant for both development scenarios.

#### **Spread of Non-Native Species as a Result of the Replacement Linkspan**

Given the small area of works, the widespread presence of existing berthing infrastructure and the existing, prevalence of non-natives throughout the local area, the impact is expected to be insignificant for both development scenarios.

#### **Noise Disturbance on Fish During Construction**

Both development scenarios are considered to result in the same underwater noise effects on fish. The noise impact assessment predicted injury effects are possible within close proximity to the proposed development as a result of piling. In addition, elevated levels of noise have the potential to cause behavioural responses in migratory fish species (such as Atlantic salmon, sea trout and European eel) at the approaches to the river Gwan in Fishguard Harbour. In addition, the construction programme will overlap with the migratory periods for Atlantic salmon and European eels. On this basis, the temporary noise impact during construction has been assessed as moderate adverse on both fish species. However, these assessments have been based on a worst-case assumption that there will be percussive piling throughout the construction period. In practice, vibro piling will be used wherever possible. In addition, all piling will involve the use of soft start procedures. With these measures in place the impact is considered to be minor for Atlantic salmon and European eel. The impact is considered insignificant for all other fish species with these measures in place.

#### **Noise Disturbance on Marine Mammals During Construction**

Both development scenarios are considered to result in the same underwater noise effects on marine mammals. Construction activities (particularly piling) has the potential to cause underwater noise disturbance impacts to marine mammals. The noise impact assessment predicted that injury responses are possible in grey seal, harbour porpoise and bottlenose dolphin in close proximity to the works for piling. The impacts on marine mammal species are considered to be major without mitigation and minor with the application of soft start procedures and JNCC piling protocols as mitigation.

## 8.0 TERRESTRIAL BIODIVERSITY

The terrestrial biodiversity assessment describes the potential significant effects of the proposed development on terrestrial ecology receptors (habitats and species including birds).

Project specific terrestrial ecology and breeding bird surveys were undertaken by competent ecologists between May and July 2017. Biological records were sought from the West Wales Biodiversity Information Centre. Impact assessment was undertaken in accordance with the Chartered Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland.

Potential effects upon sites designated for their nature conservation value were considered where relevant for terrestrial biodiversity features, with marine biodiversity features being assessed in an allied marine biodiversity chapter of the Environmental Statement.

The proposed development footprint overlaps with West Wales Marine candidate Special Area of Conservation (cSAC). Pembrokeshire Coast National Park at its closest point is located 800m north-west of the site of proposed development. Fishguard Cliffs Site of Special Scientific Interest (SSSI) is 1.1km south-east of the site of proposed development. Strumble Head – Llechdafad Cliffs SSSI is 4.7km north-west of the site of proposed development. St. David's SAC is 4.75km west of the site of proposed development. Cardigan Bay SAC is 16km north-east of the proposed development footprint. The SAC is designated for its population of bottlenose dolphin for which this is one of only two known outstanding localities in the United Kingdom.

Possible effects on designated sites for marine biodiversity features are discussed further in the Marine Biodiversity assessment. No significant effects are predicted for terrestrial biodiversity features of any designated site.

Four habitats of low value were recorded at the site of proposed development; hardstanding, buildings, open water and sea wall. No predicted significant effects will occur on any habitats of value.

Twenty-three species of bird were recorded within Fishguard Harbour including seven species of conservation concern in Wales. Five pairs of feral pigeon were recorded nesting under the quay wall within or adjacent to the proposed development. A pair of black guillemot was noted nesting in a timber stanchion under the quay wall approximately 100m north of the site and which will not be impacted by the proposed works. House martins were recorded nesting in a building which will not be impacted by the proposed works. The site is of no significant ornithological value.

No resting places or excavations made by any other protected species were recorded. No predicted significant effects will occur on any protected species.

## 9.0 TRANSPORTATION

Traffic generated by Ro-Ro ports is directly linked to the number of sailings per day, the time of the sailings, and the throughput of each vessel i.e. the number of passenger vehicles and freight vehicles. An assessment of the vessel sailings timetable was carried out to interpret the likely traffic flow profile and identify the peak traffic times.

Typically, the highest freight flows at Fishguard Port are on a Tuesday and the highest passenger flows are on a Friday. In order to determine the existing traffic flows at the harbour, new classified traffic count surveys were undertaken by MHC Traffic Ltd on Tuesday 28<sup>th</sup> November and Friday 1<sup>st</sup> December 2017 at the A40 The Parrog / A487 Wern Road / Station Hill / Port double roundabout access junction for the 12 hour period between 07:00 and 19:00. This time period covered:

- External Road Network Weekday AM peak hour;
- Interpeak caused by the Midday sailing activity at the Port;
- External Road Network Weekday PM peak hour;
- The 12 hour proposed weekday construction working hours of 07:00-19:00.

Once the replacement Linkspan is constructed and operational, the vessel numbers and vessel sizes are not expected to increase above existing levels, therefore the number of vehicle movements generated by the harbour are also not expected to increase above existing levels, resulting in a negligible traffic impact.

RPS have liaised closely with the client and other specialists in the EIA team to understand the site specific construction methodology being proposed at the site. This has allowed an estimation of construction related vehicles to be calculated for the duration of the construction programme and assessed these against the proposed working hours for the construction process.

The construction works will occur over a 6 month period. The first 3 months of the construction phase is the worst case period as during this time the vessels will still be online. The worst case assessment period is during the first 3 months is the 6<sup>th</sup> Fortnight when 13 construction vehicles are generated by the site per day and the vessels remain online. This is a relatively modest figure as during the 12 hour daily period an average of just over one construction vehicle will arrive and one depart per hour. Even if just one of the three possible approach roads to the harbour were to accommodate all of the construction vehicles, the percentage impacts on the 2-way traffic flows will be between 1.2% and 2.1% for any given scenario, which is comfortably below the 10% threshold that would indicate further assessment.

For the last three months of the construction phase the vessels will be offline. The worst case assessment period for the last three months is the 2<sup>nd</sup> and 3<sup>rd</sup> Fortnight. During this time 30 construction vehicles will arrive and 30 depart during the 12 hour working day, averaging to just 2.5 construction vehicles per hour. There will be a significant (c.70%) reduction in traffic flows at the harbour access during this period as construction traffic will only equate to c.30% of the existing traffic flows currently using the Fishguard Harbour access. There will be a reduction of 306 PCUs on a Tuesday and 293 PCUs on a Friday between 07:00 and 19:00. Therefore there will be less traffic flows on the network and a temporary increase in road capacity will be available during the last 3 months of the construction period.

The works will be carried out by approximately 10 construction related staff that will be present at the site. Even for a worst case assessment the impact of the traffic generated by the 10 staff members would be minimal and occurring at off peak times.

As is typical to the construction process, the appointed Contractor will liaise with the Local Highway Authority to agree the proposed construction traffic management measures prior to the start of the construction period. This will ensure the proposed construction activities and working hours assessed within the Transportation Chapter can be implemented.

Cumulative effects were considered with a neighbouring consented mixed-use development comprising a commercial marina, residential apartments and ancillary retail/commercial facilities. The committed scheme also includes the concept of replacing the existing double roundabout access junction with a single larger gyratory system to access both the existing harbour and the committed development.

It is considered that there will be no cumulative impact in transportation terms due to the proposed development and the committed neighbouring mixed use scheme. The committed scheme will have a +10 year construction period and is not expected to be fully operational until the year c2030. It is not expected that construction works for even the initial stages of the committed scheme will begin on site within 2 years. Similarly the reconfigured access junction associated with the committed scheme is not anticipated for delivery for between c5-10 years. In comparison, the replacement of the Linkspan is proposed to be carried out in a 6 month period upon receipt of a consent. Therefore, it is not anticipated that the construction traffic from both schemes will be in the road network at the same time.

Even if this unlikely event did occur, the requirement for both contractors to approve temporary traffic management measures with the Local Highway Authority will ensure that any potential overlap of construction traffic for both schemes will be controlled to manageable and acceptable levels.

It is therefore concluded that the impact of the scheme in transportation terms is negligible, and indeed a temporary increase road capacity will be available during the last 3 months of the construction period.

## 10.0 AIR QUALITY AND CLIMATE

The potential impact and likely significant air quality and climate effects of the proposed development have been assessed for the construction phase and operational phase. The purpose is to identify and describe any likely significant air quality and climate effects as a result of the proposed development in the context of the existing development.

Emissions from road traffic (there is no change in traffic arising from the proposed development when compared to the existing scenario) and port activity have been assessed in terms of their potential for local impact on human health. The main pollutants of concern from traffic emissions in terms of local impact are nitrogen oxides and particulate matter PM<sub>10</sub>, and these are compared to the relevant statutory limits on air quality.

The air quality and climate assessment has considered the potential and likely significant effects of the proposed development to the existing context of the site and its surrounding environment.

Dust suppression measures shall be adopted during the construction phase. The effective adoption of these procedures will ensure that there is no significant loss of amenity to adjacent housing or significant detrimental impact on human sensitive receptors as a consequence of the proposed development.

All pollutant levels are within UK and EU objective levels for the relevant pollutants in this case Nitrogen Dioxide & Particulate Matter

No likely significant effects on air quality or climate are predicted as a result of the construction or operation of the proposed development.

## 11.0 NOISE AND VIBRATION

The chapter assesses the potential impacts and likely significant effects of noise and vibration associated with the demolition, construction and operation of the replacement linkspan.

Operational vibration affecting noise sensitive receptors has been scoped out as there are no known significant vibration sources affecting the replacement linkspan site as the proposed development replaces the existing linkspan.

There is a number of existing noise sensitive receptors located around the site boundary.

Attended baseline noise monitoring survey was conducted at a number of locations in the vicinity of the replacement linkspan in order to characterise the noise environment. The purpose of the noise monitoring was to determine the baseline noise levels at the nearest noise sensitive receptors to the replacement linkspan and to determine the applicable BS 5228 noise threshold limit.

The proposed replacement linkspan was modelled using CadnaA noise modelling software. The CadnaA noise modelling software package uses the ISO 9613: 1996 "Acoustics – Attenuation of sound during propagation - Part 2: General method of Calculation" propagation requirements.

Maximum worst case construction noise levels were calculated assuming that all plant will be operating at fixed locations simultaneously, in the absence of mitigation, and fully operational throughout the working day. Noise predictions at each receptor were compared with the BS 5288 noise threshold level of 65 dB. Worst case predicted noise levels do not exceed the BS5228 noise threshold limit of 65 dB at any of the noise sensitive receptor locations.

BS5228 outlines a range of measures that can be used to reduce the impact of construction phase noise on the nearest noise sensitive receptors. These measures should be applied by the contractor where appropriate during the construction phase of the replacement linkspan. Construction noise impacts are considered to be not significant.

Construction traffic movements will not increase from the current baseline. This concludes that operational traffic noise is not significant.

The nearest noise sensitive receptors are in excess of 200m from proposed piling locations. Therefore, due to distance to the piling operations, vibration from piling operations would not be significant.

During the operational phase, there will be no significant noise impact from the proposed replacement linkspan at the nearest noise sensitive receptors.

## 12.0 WASTE MANAGEMENT

The proposed development requires the removal of the existing linkspan and installation of a replacement linkspan. Expected wastes from the removal phase will largely be inert demolition rubble, consisting of the remains of jack up pontoon, remains of existing linkspan and pile legs, remains of the existing concrete bankseat, open piled deck and seaward dolphins (600-800m<sup>3</sup>). It is estimated that there will be 10,000m<sup>3</sup> of dredged material and soft sediments with suitable material to be reused on site (there will be no reuse of dredge materials within the marine environment, seaward of mean high water springs) and the remaining disposed to a licenced landfill. Furthermore the works will result in the production of typical construction based wastes for the duration of the works programme.

In order to divert waste from landfill, possibilities for reuse of inert demolition material as fill on site in the revetments and reclamation areas will be considered, following appropriate testing to ensure materials are suitable for their proposed end purpose. Adequate facilities including non-hazardous and inert landfill sites are available with capacity in the area.

The soft sediments requiring disposal to landfill has undergone testing in accordance with Waste Classification, Guidance on the classification and assessment of waste (1<sup>st</sup> Edition, 2015), Technical Guidance WM3' produced by National Resources Wales, Scottish Environment Protection Agency, Northern Ireland Environment Agency (NIEA) and the Environment Agency. All samples were classified as Non-Hazardous in line with the Technical Guidance WM3.

All samples were also analysed for Waste Acceptance Criteria (WAC) parameters as prescribed in the Landfill (England and Wales) Regulations 2002 (and subsequent amendments). All samples were deemed suitable for disposal as Non-Hazardous Waste at a Non-Hazardous landfill. Therefore, should these sediments be brought onto land with the intention of disposal at landfill then they would be considered to meet the definition of waste under the Waste Framework Directive 2008/98/EC for disposal in a non-hazardous landfill site. There are a sufficient number of facilities in the region licensed, and with capacity to accept this material.

Currently, the reception and disposal of waste from ships using Fishguard Port is managed as per Fishguard Port's Waste Management Plan. All waste generated and/or received at Fishguard Port is currently handled, managed and disposed of by a licenced waste contractors. These procedures would continue to occur after the proposed development with no noticeable alterations to the current scenario due to waste management. Therefore the effect of the operational phase in relation to waste management is deemed as neutral.

The management of all waste materials generated during construction phase of the proposed development will be specified in a Site Waste Management Plan to be prepared by the appointed contractor.

There is significant available capacity within the existing waste management infrastructure in the Region and in the Wales to manage C, D and E waste from the proposed development works.

Appointed contractors working on the site during the works will be responsible for the collection, control and disposal of all wastes generated by the works, the appointed contractor will meet all legal requirements. All wastes will be managed off site under the principles of the waste management hierarchy by reuse, recycling, recovery and disposal to inert, non-hazardous and hazardous waste facilities, as appropriate.

A carefully planned approach to waste management and adherence to the Site Waste Management during the construction and installation phase will ensure that the impact on the environmental will be neutral, short term and imperceptible.

## 13.0 SOILS AND CONTAMINATION

The assessment of soils and contamination was based on a desk study of publicly available information such as geological maps, historical borehole logs and maps, consultation with Local Authorities and a site walkover survey.

The Desk Study identified that the site is underlain by made ground and bedrock. The underlying bedrock geology consists of the Penyraber Mudstone Formation to the south east and the Goodwick Volcanic Formation to the north west.

The site is underlain by a Secondary B aquifer which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.

An outline conceptual site model developed in the Desk Study and preliminary risk assessment has not identified any potential significant relevant pollutant linkages for the site.

The proposed development will not have any significant negative impacts on the soils, geology and hydrogeology of the area.

## 14.0 CULTURAL HERITAGE

The proposed development does not lie within a registered historic landscape as contained in the Registers of Landscapes of Outstanding and Special Historic Interest in Wales [Cadw 1998 and 2001] and there are no recorded heritage assets within the development site. A sea chart of 1748 chart suggests the presence of a series of features with Fishguard Harbour, including Goodwick Quay and a fish trap (Wear) that still survives south of Goodwick Quay. There are no known shipwreck obstacles shown at or in proximity to the development area.

Development of Fishguard Harbour to create the space that serves as the present ferry port took place at the start of the 20th century, when the headland was quarried to create a level surface along its foot. Since 1908 there has been further development. The Lifeboat Station is filled in and relocated northwards, north of the marshalling yards. The North Breakwater has been extended from a length of 660m to 800m on its south side. The present-day Admiralty Chart reveals the current layout and shows the relatively shallow nature of the seabed.

The landscape today is dominated by the reclamation of the west side of Fishguard Harbour during the nineteenth century, when the rocky bluff was quarried to facilitate the development of the rail head. A series of foreshore features survive that reveal elements from this period, including a small harbour area to the north of the present development that serves today as the RNLI berth, and a slipway to the south. The fishtrap MPRN 407699 is also visible, however none of these features lie within the development footprint. The one possible site is the quarry on the north side of the harbour where it is thought that a sooted scar remains of the seaplane crash event (MPRN 515919). One of the three works compounds for the project may be located in the open space at the base of the quarry that is currently used as storage.

An undesignated feature of cultural heritage interest was observed and recorded within the footprint for the development during the site inspection (52.008958N Lat -4.986981 Long). The feature is a length of walling that extends onto the rocky shoreline. It is traced over an area measuring approximately 30m long and survives to a height of 2–3m. The wall has a battered or sloping profile, and a rounded corner or terminus at its north end. It has been impacted upon by the adjoining concrete-built boat slip to its east/south, which has a series of concreted foundations that form a line along the toe of the unscheduled wall feature. The structure that the wall encloses is not visible and is obscured by the current ground surface. The feature represents former activity on the western shoreline of the Harbour and may reasonably be considered to relate to early nineteenth-century works. The feature is regarded as retaining local significance.

The following views were identified in accordance with the project requirement:

- View of harbour from Fishguard Bay Hotel and Park and Garden from 2nd floor bedroom windows.
- Views of harbour from looking West from Castle Point Old Fort (PE096),
- Views from Registered Historic Landscapes: Pen Gaer: Garn Fawr and Strumble Head.

The proposed development is part of a sustainable development policy for the Port which occurs between sea level and ground level and the height of which no predicted impact on the character of the landscape.

Revetment construction and reclamation including the return behind the bankseat may impact with the undesignated feature of cultural heritage interest observed during the intertidal inspection. The impact area would be focussed on the south end of the revetment construction.

There will be no impacts on any of the registered cultural heritage sites identified during the construction phase.

Visual impacts on the three view-sites are defined as indirect and slight, and no predicted impact.

The proposed development is in keeping with the current industrial port environment, and no significant residual effects have been predicted.

## 15.0 LANDSCAPE AND VISUAL

The landscape and visual assessment has established the existing landscape and visual resources likely to be effected by the proposed replacement Linkspan at Fishguard Port.

The site of the proposed replacement linkspan is located directly within Fishguard & Goodwick Coastal Townscape/Landscape Character Area that is dominated by the built form and the existing ferry terminal, and the proposed development is so similar to the existing infrastructure that it will effectively blend with the existing ferry terminal character with little noticeable alteration to the LCA and during the operational phase there will be negligible to minor adverse landscape effects.

The proposed development is located in proximity to St Nicolas Coast Farmland LCA; Skyfog Rolling Farmland LCA; Dinas Head LCA; and Cwn Gwaum Wooded Valley LCA but due to distance; intervening topography and built form and the similarities of the proposed development with the existing linkspan that no significant indirect landscape effects are predicted.

The proposal is not located directly within any landscape related landscape planning designations such as Conservation Areas or Registered Parks and Gardens. The nearest such designations are Goodwick Conservation Area and Fishguard Bay Hotel both located immediately west of the proposed development. Fishguard Bay Hotel and Goodwick Conservation Area are well screened in views and panoramic views across the Harbour will remain unaffected from the Hotel grounds. The remainder of the Conservation Area is set further back than the Hotel and views are prevented by intervening built form and existing vegetation. No significant landscape or visual effects are predicted for the Goodwick Conservation Area or Fishguard Bay Hotel. No significant direct or indirect impacts have been predicted for landscape related planning policy designations.

A series of seven viewpoints have been selected to assess the visual impact from representative views within the surrounding coastal townscape. In all such views the proposed development is located at the same location as the existing linkspan with resultant low change in visual resource and no significant visual effects have been predicted for any viewpoint.

The proposed development is located within a robust harbour setting. The wider landscape and visual resources of the site surroundings have the capacity to accommodate a development of this type and scale. No significant residual effects have been predicted.

## 16.0 POPULATION AND HUMAN ENVIRONMENT

Fishguard harbour is located in Fishguard Bay on the northern coast of Pembrokeshire County, south-west Wales. The harbour lies just north of the *twin towns* of Goodwick and Fishguard which are under a joint Town Council. The administrative Council boundary is made up of three electoral wards of Goodwick, Fishguard North West and Fishguard North East.

Fishguard and Goodwick were established during the late 10<sup>th</sup> Century, a period in which the coasts of Wales were subject to Viking raids, establishing trading posts and settlements. The settlement of Fishguard was called "Fiscard" until the turn of the 19th century when the name was "Anglicised". The town is divided into two parts, the main town of Fishguard and Lower Fishguard. Lower Fishguard (locally known as 'Lower Town') is believed to be the site of the original hamlet from which modern Fishguard originated.

Lower Fishguard developed as a herring fishery and port, trading with Ireland, Bristol and Liverpool. Goodwick was a small fishing village in the parish of Llanwnda, but in 1887 work commenced on a railway connection and harbour, and the village grew rapidly to service this.

Construction of the harbour breakwater was completed in 1906; during construction of the harbour a small estate was built directly above the harbour to house its workers, known as "Harbour Village". A smaller, inner breakwater was constructed in advance of the visit of the RMS Mauretania in 1909.

Coastline dominates the geography of the wider locale with much of the coastline made up of substantial cliffs with intermittent wide beaches; agricultural grasslands surround the villages with areas of forestry also present to the south west. The River Gwaun at Lower Town harbour flows from the wooded valley of Cwm Gwaun.

Stena Line operates ferry crossings to Rosslare, County Wexford, Ireland with two daily crossings throughout the year. The current operating vessel is the MS Stena Europe.

Access to the ferry is currently via a single lane linkspan (installed in the early 1970's) with the proposed development, seeking to remove and replace the existing linkspan with a modern linkspan but retaining the same provision of service, upon completion.

The RNLI, from Fishguard Lifeboat Station operates two lifeboats from within the harbour.

The population of Wales in 2011 was 3.06 million the largest the population had ever been. In 2011, Pembrokeshire County had a population of 122,439 which was an 8.2% rise since 2001. Overall this is approximately 4% of Wales's total population; of the total Pembrokeshire population 59,823 (48.9%) were male and 62,616 (51.1%) were female.

Changes in population are due both to differences between the numbers of births but also taking account of migration. Data on births and deaths show that between 2001 and 2011 there were 332,700 births and 320,900 deaths in Wales, leading to an increase of around 11,900 residents. This accounts for 8% of the total population increase, and reflects a steady increase in fertility rates in Wales since 2001, with the remainder of the population growth due to migration.

In the 2011 census, Fishguard recorded a population of 3,419 whilst Goodwick electoral ward had a population of 1,988; at total of 5,407 in 2011, an increase from 5,403 in 2001.

With regards to economic activity for the local authority of Pembrokeshire there were 52,601 persons recorded in employment at the time of the 2011 census. In 2013 the employment rate in Pembrokeshire was 69.5 per cent. This was the eleventh lowest amongst the 22 Welsh local authorities. The rate rose both over the year and overall since 2001 (up 0.1 and 5.0 percentage points respectively). The employment rate was above the Welsh average between 2006 and 2009, it then moved below the average in 2010 and rose back above it in 2011 where it has remained since.

The Pembrokeshire County Council Local Development Plan (LDP) 2013 provides the framework for decisions to be made up until 2021 on how land is used and developed. The Plan's vision based development strategy and policies are used to guide the development and use of land in Pembrokeshire from adoption to 2021.

The Plan Vision is as follows: “To ensure that Pembrokeshire is prosperous and that it remains vibrant and special by creating....maritime access to the Milford Haven Waterway and Fishguard Harbour and internationally important energy and tourism opportunities.”

The Plan outlines Strategic Policies, relating to a range of land-uses and topics which contribute to achieving positive change and development within Pembrokeshire. The proposed development falls within the Port and Energy Related Development zoning, SP-2, which states the following: *Strategic Policy SP-2: Port and Energy Related Development - Development at the Ports of Milford Haven and Fishguard will be permitted for port related facilities and infrastructure, including energy related development.*

The Plan further states, “At Fishguard Harbour (Goodwick) and Milford Haven Port improvements to facilities and infrastructure will benefit the local and national economy and will confer benefits on other countries, particularly the Republic of Ireland.”

The project has potential for direct positive socio-economic impacts largely relate to the requirement for construction labour related to the generation, transportation and installation of construction materials.

During the construction phase, it can be accepted that there will be fluctuations in the level and nature of construction activities however it is realistic to consider the programme as a continual construction phase. The proposed development has the potential for direct positive impacts upon the construction industry and associated sectors. For example, the requirement for quantities of quarried stone for the project construction has the potential for positive impact in terms of both direct revenue generation but also associated employment requirements.

The proposal seeks to replace the existing linkspan with a modern version, in the same location, within the existing port lands with limited numbers of receptors such as residential properties or other sensitive such land uses within the locale. Furthermore, the operational phase will have no discernible difference to the existing operations with the same levels of traffic, ferry service, and plant and machinery in operation; there is therefore very limited potential for the operational phase to result in negative impacts upon such land uses.

The ongoing provision of the Stena Line service will sustain any associated positive benefits to the local economy (such as labour and services provision) but it is also in line with the Strategic Plan policy which states ‘improvements to facilities and infrastructure will benefit the local and national economy and will confer benefits on other countries, particularly the Republic of Ireland.’

## 17.0 INTERACTIONS

EIA requires that in addition to identifying, describing and assessing in an appropriate manner, the direct and indirect significant effects of a project on population and human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and the landscape; interaction between these factors must be taken into account.

Table 17.1 is a matrix table indicating the environmental interactions that are likely to occur between the various environmental topics with regard to the proposed development. Where an asterisk exists in a box in the table, this indicates that a relationship exists between the two environmental topics. The purpose of the table is to allow interaction between various topics to be recognised, although the level of interaction will vary in each case. It is assumed in presenting this table that an environmental topic has a potential inter-relationship both during the construction and operational phases of the proposed development.

A summary of expected interactions is then given in Table 17.2.

Table 17.1: Inter-relationship Matrix – Potential Interaction between Environmental Topics

	Population and Human Environment	Cultural Heritage	Landscape and Visual	Transportation	Noise and Vibration	Air Quality and Climate	Soils and Contamination	Coastal Processes	Water Quality	Marine Biodiversity	Terrestrial Biodiversity
Population and Human Environment		*	*	*	*	*					
Cultural Heritage			*					*			
Landscape and Visual	*	*									
Transportation	*				*	*	*				
Noise and Vibration	*			*						*	*
Air Quality and Climate	*			*			*		*		*
Soils and Contamination				*		*			*	*	*
Coastal Processes		*							*	*	*
Water Quality						*	*	*		*	*
Marine Biodiversity					*		*	*	*		*
Terrestrial Biodiversity					*	*	*	*	*	*	

Table 17.2: Summary of Interactions

Topic	Interaction With	Interaction
<b>Population and Human Environment</b>	Noise and Vibration	Noise and vibration generated from construction phase of the proposed development has the potential to impact upon the local community. The assessment does not however identify any likely significant noise or vibration effects.
	Air Quality and Climate	Dust and other emissions generated from construction phase of the proposed development has the potential to impact upon air quality of the local community. The assessment does not however identify any likely significant air quality effects.
	Cultural Heritage	Construction phase of the proposed development has the potential to impact upon cultural heritage remains on the seabed. Operational phase of the proposed development has the potential to impact upon views from cultural heritage assets in the vicinity of the proposed development. The assessment does not however identify any likely significant cultural heritage effects.
	Transportation	Transportation requirements of materials at construction phase of the proposed development has the potential to impact upon users of the existing road network. The assessment does not however identify any likely significant transportation effects.
	Landscape and Visual	The proposed development has the potential to impact on the landscape and visual resources perceived by human beings. The assessment does not however identify any likely significant landscape or visual effects.
<b>Cultural Heritage</b>	Coastal Processes	The proposed development has the potential to impact on cultural heritage remains on the seabed by modifying the sedimentation and erosion regime at Fishguard Port. The assessment does not however identify any likely significant coastal process effects.
	Landscape and Visual	Construction phase of the proposed development has the potential to impact upon cultural heritage remains on the seabed. Operational phase of the proposed development has the potential to impact upon views from cultural heritage assets in the vicinity of the proposed development. The assessment does not however identify any likely significant cultural heritage effects.
<b>Landscape and Visual</b>	Population and Human Environment	The proposals have the potential to impact on the landscape and visual resources perceived by human beings; however no significant impact for the proposed development is predicted.
	Cultural Heritage	Operational phase of the proposed development has the potential to impact upon the visual setting of cultural heritage resources. The assessment does not however identify any likely significant cultural heritage effects.
<b>Transportation</b>	Noise and Vibration	Traffic generated at construction phase has potential to result in noise impacts. The assessment does not however identify any likely significant noise effects due to road traffic.
	Air Quality and Climate	Traffic generated at construction phase has potential to result in air quality impacts. The assessment does not however identify any likely significant air quality effects due to road traffic.
	Population and Human Environment	Traffic generated at construction phase has potential to result in impacts upon users of the existing road network. The assessment does not however identify any likely significant effects.

Topic	Interaction With	Interaction
	Soils and Contamination	There is potential for generation of contaminated soils at construction phase, which will be removed from the port by road transport if not suitable for re-use on site. The soils and contamination assessment does not however identify any likely significant effects.
Noise and Vibration	Terrestrial Biodiversity	Noise from construction phase of the proposed development has potential to impact on terrestrial biodiversity features. The terrestrial biodiversity assessment does not however identify any likely significant effects.
	Marine Biodiversity	Noise from construction phase of the proposed development has potential to impact on marine biodiversity features. The marine biodiversity assessment identifies likely potential significant effects and proposes mitigation to reduce the magnitude of those effects.
	Transportation	Traffic generation has potential to result in noise related impacts at construction phase. The transport assessment does not however identify any likely significant effects.
	Population and Human Environment	Noise and vibration generated from the construction and operational phases of the proposed development have the potential to impact upon local communities, however no likely significant effects are predicted.
Air Quality and Climate	Water Quality	Dust and other emissions generated at construction phase have potential to result in impacts upon marine water quality. The assessment has not however identified any likely significant water quality effects due to air quality effects.
	Soils and Contamination	Excavation works and exposure of soils during the construction phase can influence air quality. The movement of soils during the construction phase may result in the spread of dust and mud onto surrounding land and public roads, however no likely significant effects have been predicted.
	Transportation	Traffic generation has potential to result in impacts on Air Quality at operational phase of the proposed development however traffic will not increase as a result of the proposed development.
	Population and Human Environment	The construction and operational phases of the redevelopment have the potential to generate impacts in terms of air quality upon local population centres; the air quality assessment does not identify any significant impacts however.
Water Quality	Soils and Contamination	The disturbance of seabed material at construction phase of the proposed development can influence marine water quality. The assessment identifies likely potential significant effects and proposes mitigation to reduce the magnitude of those effects.
	Coastal Processes	The coastal processes of the port area at construction and operational phases of the proposed development can influence marine water quality. The assessment identifies likely potential significant effects and proposes mitigation to reduce the magnitude of those effects.
Marine Biodiversity	Water Quality	Marine biodiversity is dependent on water quality. Deterioration of water chemistry or suspended sediment concentrations has potential to impact on marine biodiversity. The water quality assessment identifies likely potential significant effects and proposes mitigation to reduce the magnitude of those effects.
	Noise and Vibration	Underwater noise producing activities have the potential to impact upon marine species. The marine biodiversity assessment identifies likely potential significant effects and proposes mitigation to reduce the magnitude of those effects

Topic	Interaction With	Interaction
	Soils and Contamination	The disturbance of seabed material at construction phase of the proposed development can affect marine biodiversity. The assessment identifies likely potential significant effects and proposes mitigation to reduce the magnitude of those effects.
	Terrestrial Biodiversity	Birds and seabirds are assessed under Terrestrial Biodiversity, but seabirds are dependent on the marine environment for their prey. No likely significant impacts are predicted upon seabirds.
	Coastal Processes	There is an inter-relationship between coastal modelling and marine biodiversity impacts. Following assessment, no significant coastal process impacts are predicted for the proposed development.
<b>Terrestrial Biodiversity</b>	Noise and Vibration	Noise from construction and operational phases of the proposed development has potential to impact on terrestrial biodiversity features. Following assessment, no likely significant impacts are predicted for the proposed development.
	Air Quality and Climate	Dust and other emissions from construction and operational phases of the proposed development has potential to impact on terrestrial biodiversity features. Following assessment, no likely significant impacts are predicted for the proposed development.
	Marine Biodiversity, Coastal Processes, and Water Quality	Birds and seabirds are assessed under Terrestrial Biodiversity, but seabirds are dependent on the marine environment for their prey. The water quality assessment identifies likely potential significant effects and proposes mitigation to reduce the magnitude of those effects.

An assessment has been completed on the interactions that are likely to occur between the various environmental topics with regard to the proposed development. As set out in Table 17.2 above no likely significant residual effects have been predicted for interactions between the various EIA topics with the imposition of mitigation measures during the construction and operational phases of the proposed development.