

REPORT

Holyhead Breakwater Refurbishment Scheme Environmental Impact Assessment

Non-Technical Summary

Client: Isle of Anglesey County Council

Reference: PB9014-RHD-ZZ-XX-RP-Z-0212

Status: S0/P01.01

Date: 04 May 2021

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Document title: Holyhead Breakwater Refurbishment Scheme Environmental Impact Assessment

Document short title:

Reference: PB9014-RHD-ZZ-XX-RP-Z-0212
Status: P01.01/S0
Date: 04 May 2021
Project name: Holyhead Breakwater Refurbishment Scheme EIA
Project number: PB9014
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Classification

Project related

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Acronyms

Acronym	Definition
ACBM	Articulated Concrete Block Mattress
CD	Chart Datum
CEMP	Construction Environmental Management Plan
CIA	Cumulative Impact Assessment
EIA	Environmental Impact Assessment
GHG	Greenhouse Gas
HRA	Habitats Regulations Assessment
IoACC	Isle of Anglesey County Council
LWS	Local Wildlife Site
NRW	Natural Resources Wales
NSN	National Site Network
NTS	Non-Technical Summary
PAC	Pre-Application Consultation
OBC	Outline Business Case
OD	Ordnance Datum
RNLI	Royal National Lifeboat Institution
SAC	Special Area of Conservation
SPA	Special Protection Area
WFD	Water Framework Directive
WG	Welsh Government

1 Introduction

1.1 Purpose of Document

This document represents the ‘Non-Technical Summary’ (NTS) of the Environmental Impact Assessment (EIA) Report of the Holyhead Breakwater Refurbishment Scheme (the ‘proposed scheme’), providing an overview, in non-technical language, of the main findings of the EIA Report. It is important to note that this NTS does not, and is not intended to, convey all of the information relating to the Proposed Scheme and its potential effects on the environment. By necessity, the text provided herein is a summary of the detailed assessments discussed in the EIA Report.

1.2 Background

Constructed between 1848 and 1873, Holyhead Breakwater (“the Breakwater”) provides an area of sheltered water for the Port of Holyhead and Holyhead New Harbour and provides protection to the surrounding coastline from coastal erosion and flooding (**Figure 1-1**). The Breakwater is a Grade II* listed Victorian structure and, at a total length of 2.4km, is the longest breakwater in the UK. At the end of the Breakwater (the roundhead) sits the Grade II-listed Holyhead Breakwater Lighthouse. The Breakwater is formed by a wide rubble mound with a crest around the waterline and a vertical blockwork-walled superstructure on top (**Figure 1-2**).

Over time the Breakwater has been subject to considerable wave action, which has led to the displacement and erosion of the rock that makes up the rubble mound and, consequently, a loss of integrity of the rubble mound itself (see **Plate 1-1**). As a result, the rubble mound has been subject to regular, expensive maintenance through the partial replacement of lost material. The vertical blockwork wall superstructure is subject to periodic damage, which is repaired on an ongoing basis.

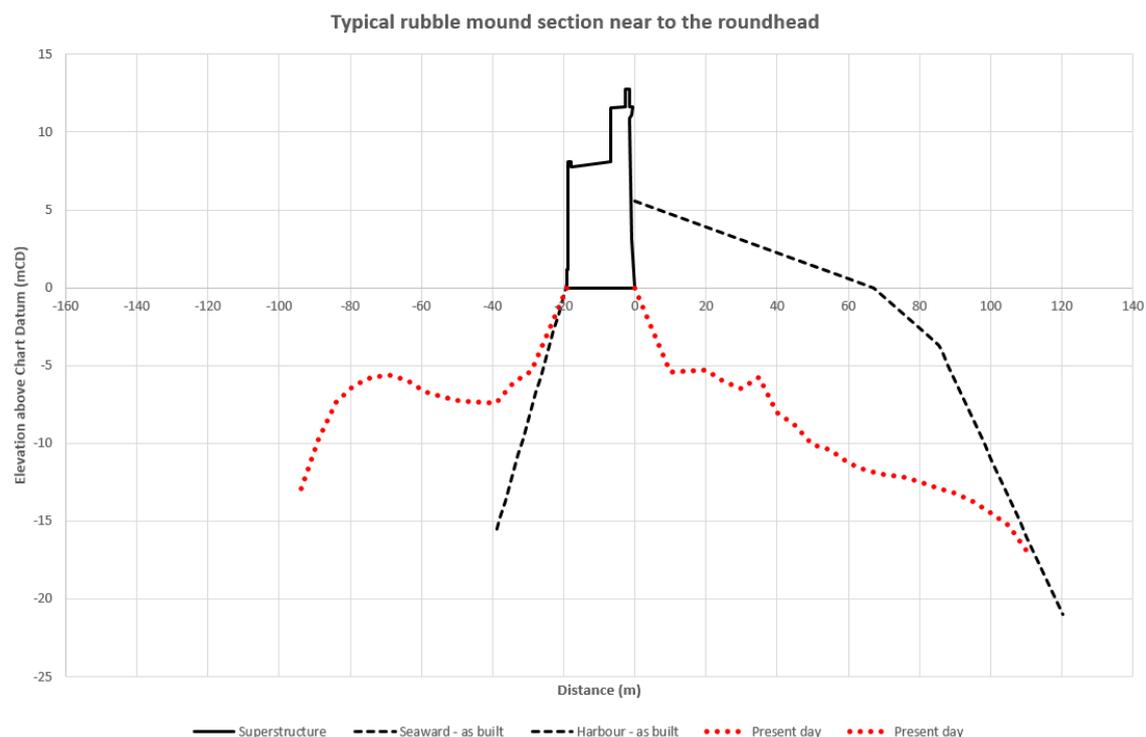
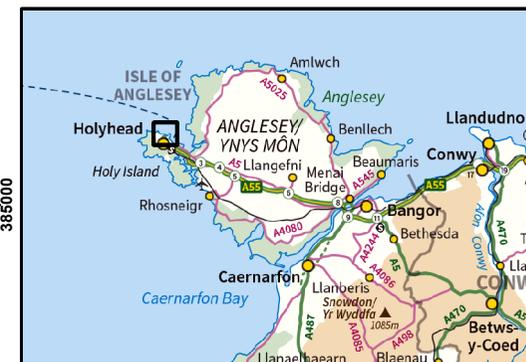
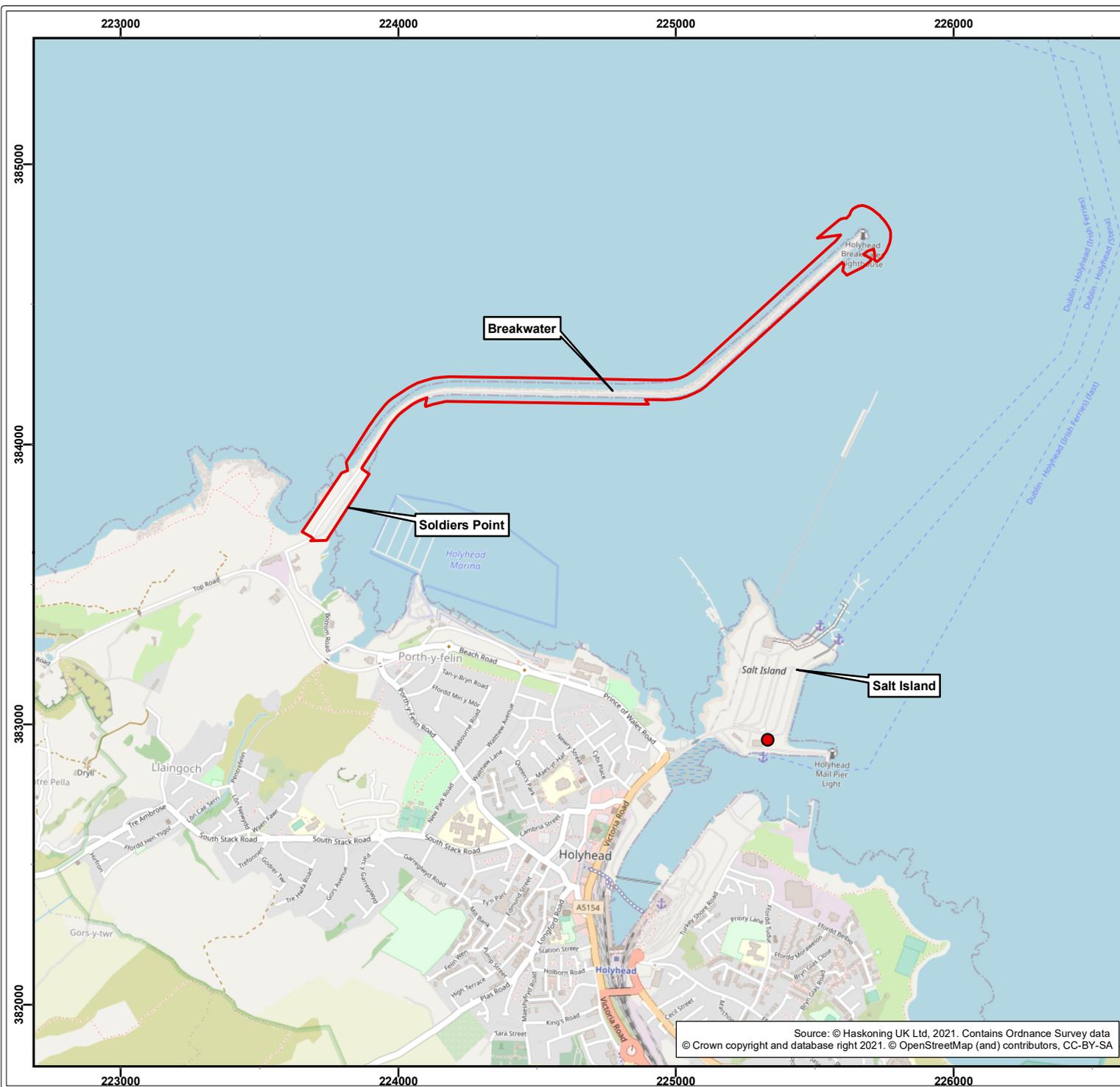


Plate 1-1 Cross-section of the Breakwater structure showing erosion of the rubble mound



Legend:

- Holyhead Breakwater
- Potential Location of Concrete Batching Plant

Client: Isle of Anglesey County Council	Project: Holyhead Breakwater Refurbishment Scheme
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Title:
Location Plan

Figure: 1.1 Drawing No: PB9014-200-014

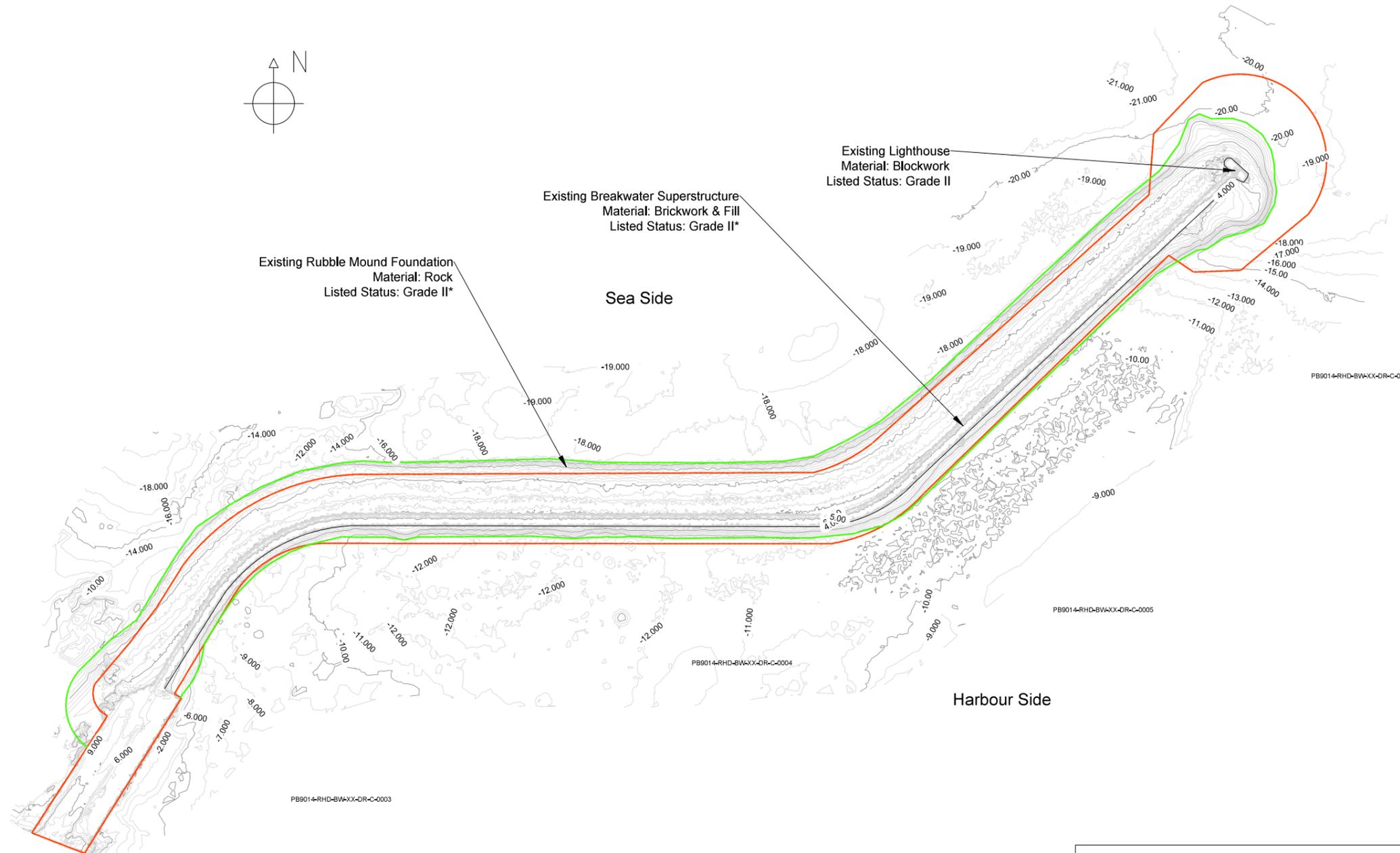
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01	24/02/2021	AB	KD	A4	1:20,000

Co-ordinate system: British National Grid

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- ALL LEVELS IN METERS RELATIVE TO CHART DATUM.



Existing Rubble Mound Foundation
Material: Rock
Listed Status: Grade II*

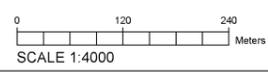
Sea Side

Existing Lighthouse
Material: Blockwork
Listed Status: Grade II

Harbour Side

KEY

- FOOTPRINT OF THE EXISTING RUBBLE MOUND
- EXTENT OF THE PROPOSED REFURBISHMENT
- CONTOURS AT 1m INTERVALS



PO2	22.06.19	SUITABLE FOR INFORMATION			
PO1.01	05.04.19	SUITABLE FOR INFORMATION			
REV	DATE	DESCRIPTION	BY	CHK	APP

REVISIONS

CLIENT



PROJECT
HOLYHEAD BREAKWATER REFURBISHMENT

TITLE
REFURBISHMENT FOOTPRINT PLAN VIEW



DRAWN	P.S.	CHECKED	APPROVED
DATE	04.11.2019	SCALE	1:4000
GROWING No.	PB9014-RHD-BW-XX-DR-C-0001	SUITABILITY	S2
		REVISION	P03

Stena Line Ports Ltd ('Stena Line') is proposing to carry-out a long-term and sustainable solution to the erosion of the rubble mound so that it can continue to provide a stable foundation for the superstructure. The proposed works comprise (see **Chapter 4** for further details):

- **Seaward side** – installation of concrete armour onto the existing rubble mound along the length of the Breakwater, in the form of 18.1m³ Tetrapod units and reinforcing 120-tonne Z-shaped concrete units to prevent displacement;
- **Breakwater roundhead** – rock placement to widen the existing rubble mound, with installation of Tetrapod units and reinforcing Z-shaped blocks; and,
- **Leeward side** – restoration of the existing rubble mound along sections of the Breakwater through the installation of an Articulated Concrete Block Mattress (ACBM), and rock revetment where the existing rubble mound is too steep to accommodate the ACBM.

The proposed scheme requires approval through three key pieces of legislation, namely:

- The Town and Country Planning Act 1990;
- Marine and Coastal Access Act 2009, as amended¹; and,
- Planning (Listed Buildings and Conservation Areas) (Wales) Act 2012, as amended².

¹ Amended by the Marine and Coastal Access Act 2009 (Amendment) Regulations 2011

² Amended by the Planning (Listed Buildings and Conservation Areas) (Wales) (Amendment No. 2) Regulations 2017

2 The EIA Process

2.1 What is EIA?

In accordance with UK law, certain projects must be the subject of a particular process of environmental assessment due to their size, nature and the likelihood that they will have significant effects upon the environment. This assessment process is known as EIA.

EIA provides a valuable opportunity to avoid and reduce potential environmental impacts through design refinement. Environmental constraints and issues were identified through consultation, extensive environmental surveys and technical assessments. The information gathered has informed decision-making throughout the design process, providing opportunities to address potentially significant impacts where practicable, for example by refinement of the refurbishment scheme design or by the incorporation of measures to avoid or reduce potential adverse impacts.

2.2 Requirement for EIA

The Isle of Anglesey County Council (IoACC) confirmed via their Screening Opinion (dated 17th February 2020) that the proposed scheme is considered EIA Development under Schedule 2 10(m) of the Town and Country Planning (EIA) (Wales) Regulations 2017, as:

(m) Coastal work to combat erosion and maritime works capable of altering the coast through the construction, for example, of dykes, moles, jetties and other sea defence works, excluding the maintenance and reconstruction of such works;

Natural Resources Wales (NRW) confirmed via their Screening Opinion that the proposed scheme does not constitute EIA Development under the Marine Works (EIA) Regulations 2007, as amended³. Given IoACC's requirement for an EIA, it was agreed with NRW that an EIA would be undertaken by agreement, in accordance with Section 5 of the Marine Works (EIA) Regulations 2007, as amended ("Requirement of assessment by agreement"), in order to align with the requirements of the planning permission.

2.3 Scope of the EIA

The following topics were required to be considered ('scoped in') by the EIA as having the potential to be significantly affected by the proposed scheme:

- Coastal Processes
- Traffic and Transport
- Air Quality
- Noise and Vibration
- Marine Ecology
- Ornithology
- Terrestrial Ecology
- Visual Setting
- Cultural Heritage
- Climate Change
- Cumulative effects

³ Most recently amended by the Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2017

The characteristics of the existing (baseline) environment for each topic have been defined, and the potential environmental impacts of the proposed scheme identified and assessed through the following methods and activities:

- Desk based reviews, interpretation and assessment of existing data;
- Site surveys; and,
- Consultation.

The surveys and investigations that have been undertaken to characterise the baseline environment and predict environmental effects, include:

- Numerical and physical modelling;
- Marine and intertidal ecology survey;
- Visual appraisal including photomontages;
- Noise modelling;
- Air quality modelling; and,
- Desk based assessment and heritage statement.

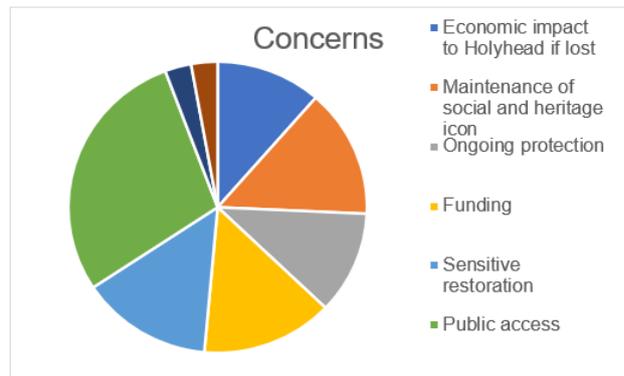
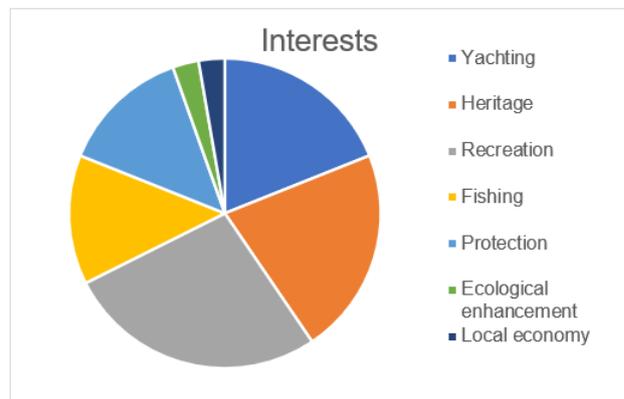
2.4 Consultation

Consultation has been ongoing throughout the EIA process, including the Welsh Government (WG), NRW, the IoACC, Cadw, Gwynedd Archaeological Planning Service and Stena Line as part of the pre-application process, as well as formal consultation through the EIA screening and scoping stages.

In addition, a public consultation event for the proposed scheme was held on the 29th of March 2019 in Holyhead Town Hall. The event introduced the scheme to the local residents and business owners and sought their opinions on the plans. A summary of the responses is provided in the diagrams on the right.

Further consultation with other individuals and organisations has also been undertaken in order to collect additional information to the inform the EIA and to assess potential impacts and determine an appropriate mitigation and monitoring strategy.

Consultation will continue to be undertaken with the public and stakeholders as part of the statutory Pre-Application Consultation (PAC) process.



2.5 Impact Assessment

Impact assessment is a fundamental element of the EIA process and the results of this process are present in the EIA Report. Impacts are positive or negative and result either directly or indirectly from activities associated with the refurbishment scheme. Each potential impact is assessed for its likely significance, based on a number of factors including the sensitivity and environmental or economic value of the receptors being considered, the magnitude of the impacts and the risk of such impacts occurring.

In addition to the determination of potential impacts from the proposed scheme, an assessment of the potential for cumulative effects has been undertaken, which considers the impacts from the proposed scheme with potential impacts from other proposed projects in the wider vicinity.

2.6 Mitigation

Mitigation measures have been proposed, where available and practical, in those cases where adverse impacts have been identified. It is important to note that the mitigation measures applied should be proportionate to the scale of the impact predicted. Appropriate mitigation measures have been discussed and agreed, where possible, with the relevant regulatory authorities and stakeholders.

Whilst mitigation for minor or negligible impacts may not be specifically defined as a matter of course, industry standard or 'embedded' mitigation often applies in these cases. It is also recognised that minor and negligible impacts could become significant when considered cumulatively with other pressures on a receptor and, in this event, mitigation may be required.

2.7 Residual Impacts

Where further mitigation measures are identified, the significance of the residual environmental impact (i.e. the post-mitigation impact) is assessed.

2.8 Reporting

The findings of the EIA are presented in the EIA Report. In addition to adhering to the requirements of the EIA Regulations, the EIA Report also meets the requirements of:

- The Conservation of Habitats and Species Regulations 2017, as amended⁴; and
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

This NTS presents a summary of the EIA Report, including key aspects of the proposed scheme and the associated beneficial and adverse impacts considered to be of particular importance. Further details about the likely significant impacts of the proposed scheme can be found within the full text of the EIA Report. The EIA Report has been subdivided into three volumes, as follows:

1. NTS;
2. EIA Report; and,
3. Technical Appendix – Specialist Technical Reports.

⁴ Amended by Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

3 Need for the Proposed Scheme

Tourism is the largest economic sector on Anglesey, generating £311M per annum to its economy and supports approximately 4,000 jobs. Holyhead is the UK's second busiest port processing two million visitors travelling between the UK and the Republic of Ireland, further boosting Anglesey's tourism sector. More recently, Holyhead has emerged as Wales' premier cruise port with 52 cruise ships arriving in the port in 2018, which brought in 32,700 passengers and generated a cruise tourism impact in excess of £2.5M.

The importance of Holyhead Port for both ferry passengers and the cruise ship industry is vital to the Anglesey and North Wales economy. The Breakwater supports the economy of Holyhead and the wider Anglesey and North Wales region in its role of protecting the Port and Holyhead Harbour by supplying opportunities for regeneration and development, offering security for investments into the area and preventing flooding from wave overtopping.

Since its completion in 1873 the Breakwater has gradually been eroded away by wave action. Without maintenance the loss of material through erosion would eventually result in the Breakwater being undermined, which could expand along the length of the structure culminating in total failure.

Due to its design, the Breakwater has always required regular maintenance. Whilst the current maintenance regime provides a temporary solution to the problem, the likelihood of a failure of the Breakwater during more frequent and severe storm events increases with time. This maintenance regime has become increasingly expensive and is no longer matching the rate of erosion; therefore, a more viable long-term solution to ensure the stability of the breakwater is required.

If the Breakwater were to fail, then the wave climate in the New Harbour and at the Port of Holyhead would increase significantly, resulting in the following impacts:

- The loss of the Grade II*-listed Holyhead Breakwater and access to the Grade II-listed Holyhead Breakwater Lighthouse;
- The loss of a reliable ferry and freight service to Ireland resulting in the port eventually becoming unviable with the associated losses of income and employment to the town;
- The loss of refuge provided by the Holyhead Harbour, one of the main reasons for the construction of the Breakwater;
- More frequent flooding events due to wave overtopping in the Beach Road and Prince of Wales Road areas of the town, affecting 19 properties including the RNLI lifeboat station, HM Coastguard Station and Holyhead Maritime Museum;
- Closure of the marina and sailing club due to increased wave climate;
- Forced relocation of the RNLI Lifeboat station; and,
- Loss of confidence of investors in several major proposed regeneration and development projects.

A permanent solution to the constant erosion of the foundations of the Breakwater and damage of the blockwork-walled superstructure itself is required before the next breach occurs, which is predicted within the next 15 years.

4 The Proposed Scheme

4.1 Overview

The proposed approach to the refurbishment of the seaward and leeward sides of the Breakwater is described in this section and within Chapter 3 of the EIA. Most of the refurbishment works described would be located within the existing footprint of the Breakwater; however, there is a small area at the roundhead of the Breakwater that would extend past the rubble mound as it currently exists, though is within the original footprint of the Breakwater when it was constructed.

4.2 Description of the Construction Phase

4.2.1 Delivery and Storage of Materials

There are two options under consideration for the delivery of refurbishment materials and plant machinery:

- Delivery of refurbishment materials and plant machinery to Holyhead Port by sea or road; or,
- Delivery of refurbishment materials and plant machinery to Soldier's Point by sea.

Under both options, the material would be stockpiled and then transported to the refurbishment site by barge. At any given moment during the construction phase, up to three barges may be in use for the transportation of material from the stockpiles to the refurbishment site.

4.2.2 Fabrication of Concrete Armour Units

There were two options considered for the fabrication of the concrete armour units. The first would require a temporary concrete batching plant to be established on Salt Island, whilst the second, and preferred, option would be to use an existing facility elsewhere.

The concrete armour units would be transported to the refurbishment site by barge. At any given moment during the construction phase, up to three barges may be in use for the transportation of the concrete armour units to the refurbishment site.

The area at Soldier's point is an existing industrial quay owned by Stena Line and would be used for storage of concrete armour units during the construction works.

4.2.3 Placement of Refurbishment Material

Marine-based plant would be used for the placement of the armour units (i.e. Tetrapods, Z-shaped concrete armour units, rock and ACBM). A jack-up or floating barge with spud legs, or an alternative form of anchoring system, would provide a platform for a crane and a long-reach excavator.

Whilst a suitable method of anchoring the barge has yet to be confirmed, one option is that a series of concrete anchor blocks placed seaward of the rubble mound may be used to hold the barge in place. Up to two barges would be used to transport the armour units to the jack-up / floating barge. From the jack-up / floating barge, armour units would be lowered into place on the existing rubble mound by crane.

At the roundhead, there may be a need to place rock outside the footprint of the existing rubble mound. This would be placed directly onto the seabed over an area that formed part of the footprint of the original breakwater, constructed in the 1800s.

4.2.4 Regrading Works

The level of the existing rubble mound undulates along its length due to the seabed topography and the influence of environmental conditions such as tides, wind and waves. Where undulations are such that they would prohibit the concrete armour units from sitting in a stable orientation, it may be necessary to regrade such areas. Regrading works would be carried out by spreading rubble using a long-reach excavator from the anchored barge. It is anticipated that very little regrading works would be required, and there would be no requirement for the removal of rubble from the site.

4.2.5 Construction Programme

There are two programme options being considered for the proposed scheme:

- Completion of the refurbishment works in a single phase (the preferred option). This is likely to commence around March 2022, with expected completion around January 2024; and,
- Completion of the refurbishment works across three phases. An example timeframe is:
 - Phase 1: March 2022 – October 2022;
 - Phase 2: March 2025 – October 2025; and,
 - Phase 3: March 2027 – October 2027.

4.3 Description of the Operational Phase

4.3.1 Seaward Side

The refurbishment of the seaward side of the Breakwater comprises the placement of double-stacked Tetrapod concrete armour units weighing between 40 and 45tn each, extending from the superstructure to a width of approximately 30m and with a crest elevation of +6.7m Chart Datum (CD) (+3.7m Ordnance Datum (OD)). At the toe end of the Tetrapods, a row of interlocking 120t Z-shaped concrete armour units would be placed to prevent displacement of the Tetrapods from continuous or severe wave action (see **Plate 4-1**).

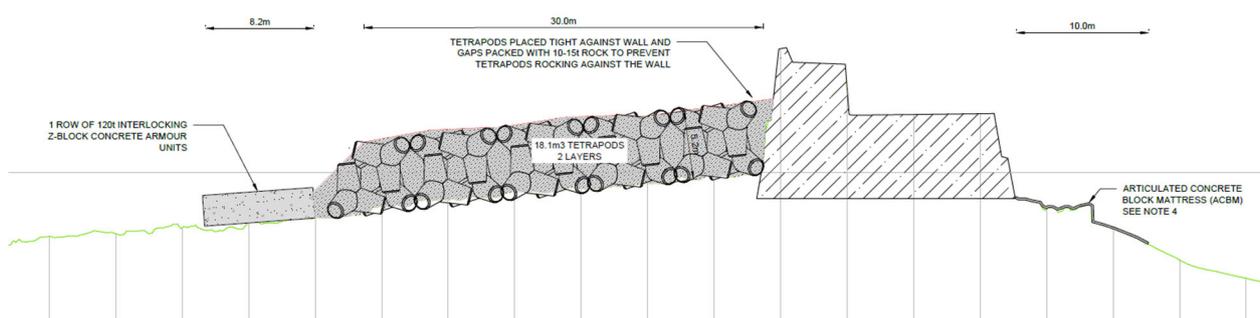


Plate 4-1 Cross-section of seaward side refurbishment

At the landward end of the Breakwater, adjacent to Soldier's Point, 10-15tn rock would be placed in a small triangular-shaped area, as a transition between the Tetrapods / Z-shaped units and the seaward-facing wall at Soldier's Point.

Given the need to take account of sea level rise, the design height of the double layer of Tetrapods is required to be 1.1m above mean high water spring level, therefore the upper extent of the Tetrapods would be visible throughout the tidal cycle.

The refurbishment of the seaward side of the Breakwater would stabilise the rubble mound at the toe of the superstructure and restore the level of protection by dissipating wave energy. This would reduce the risk of emergency works whilst also reducing the risk of overtopping, thus minimising the need for future repairs to the superstructure of the Breakwater.

4.3.2 Roundhead

At the roundhead of the Breakwater, the rubble mound has suffered considerable erosion and narrowing due to tidal and wave action, therefore the current rubble mound profile would have to be widened to enable the Tetrapods to be installed. To achieve this, three rock berms or tiers would need to be installed on the seabed to a level of around 0m CD (-3m OD) (see **Plate 4-2**).

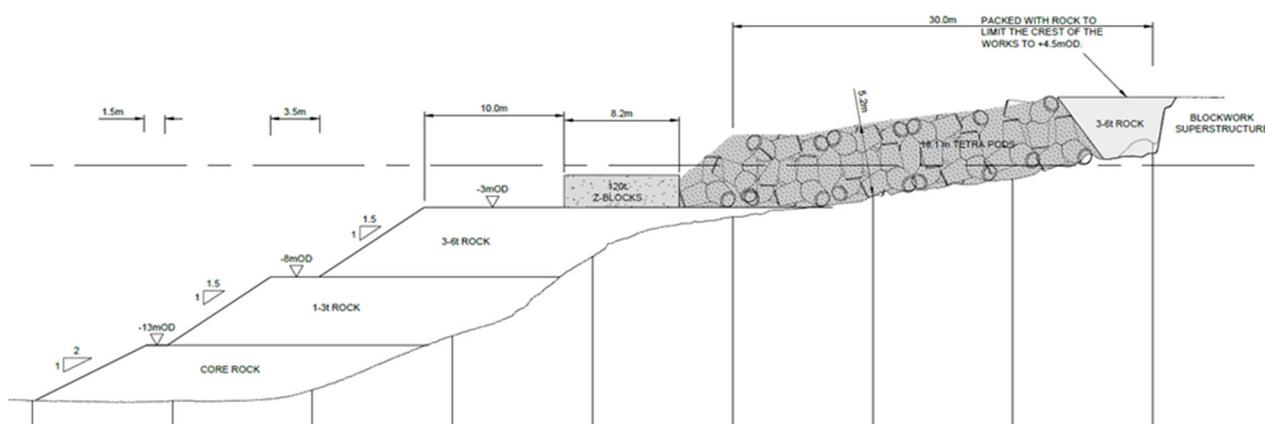


Plate 4-2 Diagram showing the three rock tiers around the roundhead

These tiers would be formed by either dropping rock from a barge or, alternatively, a clamshell bucket could be attached to a long reach excavator or crawler crane and the rock placed into its final position. It may also be possible to place smaller material using a large diameter pipe which is lowered to the seabed through which rock material is transported onto the seabed. The use of a fall pipe would help minimise potential environmental impacts when compared to it being tipped from a barge.

4.3.3 Leeward side

Along the outermost section of the Breakwater, an ACBM would be placed along the leeward side of the superstructure, with a width of approximately 10 – 15m, to prevent further erosion of the rubble mound. Additional rock may be required to raise any low sections before the ACBM is installed. Any prominent high points would be regraded, as required. The ACBM would provide a good level of protection to the existing lee wall against waves generated within the harbour and waves diffracted around the head of the Breakwater. A low-level rock revetment would be installed along the central section of the Breakwater where the existing mound is too low and/or too steep to accommodate the ACBM. The finished height of the ACBM and rock revetment would be lower than mean low tide and as such would not be visible during most tides; however, during spring tides the ACBM and revetment would be visible at low water.

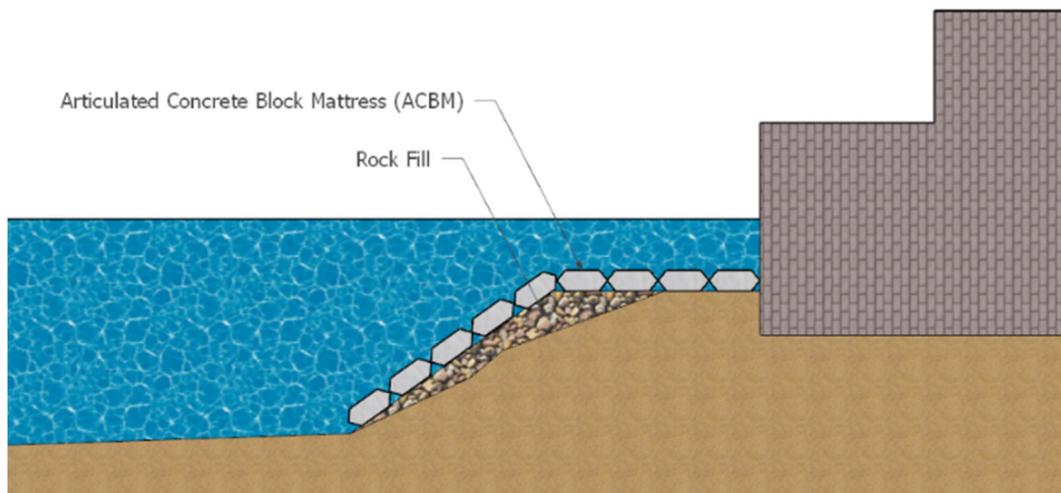


Plate 4-3 Diagram of leeward side refurbishment

4.3.4 Maintenance requirements

Once the refurbishment of the Breakwater is complete, further maintenance of the rubble mound would be minimal and far less than the current maintenance activities. Wave overtopping of the superstructure would be reduced by around 90% and as such any repointing and repair of the superstructure would also be reduced. The structure would continue to be monitored annually and repairs undertaken if damage occurs.

4.3.5 Measures to manage environmental risks

As with any construction project, there would be the potential for spillages or leakages of oils, fuels or construction materials which would directly or indirectly impact upon the environment. The risk of this occurring would be managed through the production of a Construction Environmental Management Plan (CEMP) setting out best practice measures to be employed during the refurbishment works.

Stena Line has plans and procedures in place to manage environmental risk during the regular operation of the port. This includes an Oil Spill Contingency Plan which was produced in consultation with the IoACC, NRW, Welsh Government Fisheries and the Marine Management Organisation for use in the event of a spill.

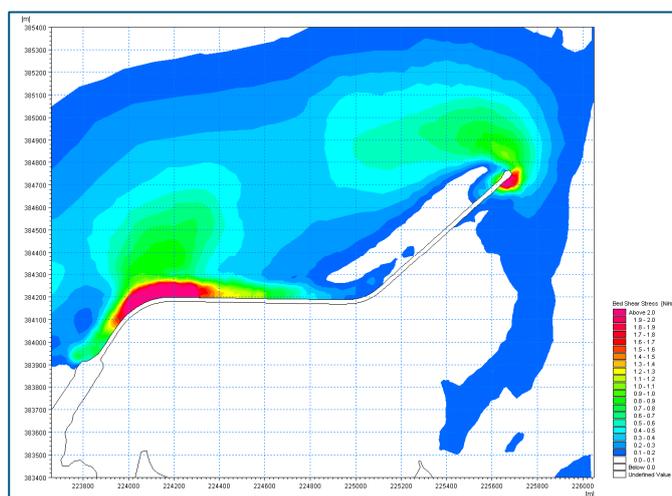
Stena Line has also produced a Biosecurity Plan in consultation with NRW in order to prevent or reduce the spread of invasive non-native species within Holyhead Port limits, which would be adhered to throughout the construction phase and any subsequent maintenance activities. A project specific biosecurity risk assessment will be undertaken by the chosen contractor prior to the works being undertaken.

5 Summary of Predicted Environmental Impacts

5.1 Coastal Processes

The Coastal Processes assessment considered the construction and operational phases of the proposed scheme and its potential effects on relevant features, including two marine conservation sites. It used existing numerical (an example of which is shown on the right) and physical modelling work as part of an expert-based assessment approach to define the baseline physical conditions and the effects of the proposed scheme.

The assessment considered the potential impacts of the proposed scheme on waves, currents and movement of sediment, both in the water column and along the seabed. Potential construction impacts relate to increases in suspended sediment concentrations and changes in seabed level during and after placement of concrete. Potential operational impacts relate to changes to the tidal current, wave and sediment transport regimes due to the presence of the refurbished breakwater.



Predicted current speed at the seabed two hours before high tide for a spring tide

Overall, the effects of the proposed scheme on coastal processes were predicted to be small-scale, localised and temporary and hence of **negligible** significance.

5.2 Traffic and Transport

The Traffic and Transport assessment considered the worst-case scenario, whereby the concrete batching plant would be located on Salt Island and delivery of materials would be by road. In accordance with national guidance, the traffic and transport study area was identified, baseline conditions established and sensitive receptors identified. The traffic and transport study area was screened to identify routes that could be potentially impacted by the project's traffic generation.

A total of four highway links were assessed for the effects of severance, amenity, road safety and driver delay. The residual impact for all highway links was assessed to be **not significant** during the construction works.

5.3 Air Quality

The Air Quality assessment considered air quality impacts during construction of the proposed scheme on local air quality. Operational phase impacts on air quality were scoped out of the assessment, as maintenance of the proposed scheme would be minimal and far less than the current maintenance activities.

Potential air quality impacts associated with the proposed scheme include dust, road vehicles and vessel exhaust emissions. Likely significant effects of dust and plant emissions were assessed using best practice guidance. The recommended best practice mitigation measures, to form part of a CEMP, to minimise dust and pollutant emissions from on-site construction activities means that off-site effects were considered to be **not significant**.

Detailed air quality dispersion road vehicle modelling was undertaken to predict impacts on human and ecological receptors as a result of emissions from construction-generated traffic (road and vessels). Potential impacts were found to be **not significant** at both human and ecological receptors. Potential impacts of construction phase shipping vessel emissions were assessed qualitatively and were found to be **not significant**.

5.4 Noise and Vibration

The Noise and Vibration assessment considered potential impacts during the construction stage of the proposed scheme, including on-site construction works at both Soldier's Point and Salt Island, and construction traffic along the local road network.

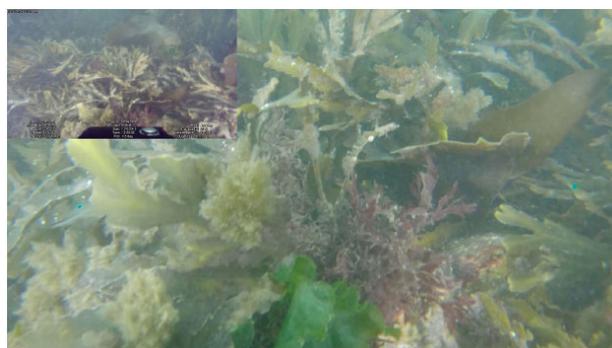
The assessment of on-site construction works was informed by available baseline noise data. Predicted noise levels were more than 5dB below the respective noise thresholds, set by national guidance, at all receptors, indicating a **negligible** impact and no requirement for mitigation.

The change in noise level associated with construction road traffic was assessed in accordance with the required guidance. The assessment indicated **negligible** impacts along the road links, as identified by the Traffic and Transport assessment (see **Section 5.2**).

5.5 Marine Ecology

The Marine Ecology assessment was informed by video transect surveys of the seaward and leeward sides of the Breakwater using a Remotely Operated Vehicle and Drop-Down Video. The results of these surveys showed that the intertidal and subtidal habitats present were typical of those commonly found around the Anglesey and North Wales coastline (see example photo to the right).

Although considered as medium magnitude, the temporary loss of intertidal and subtidal habitats and species within the proposed scheme's footprint was determined to be of **minor adverse** significance due to the relatively common occurrence of the habitats throughout the coastline of Anglesey and North Wales, and taking account of the fact that the chevron and Tetrapod units would quickly become colonised by similar species.



Fucus serratus and red seaweeds on moderately exposed lower eu littoral rock

An invasive non-native species survey was also undertaken to determine the presence of, in particular, carpet sea squirt (*Didemnum vexillum*) on structures within and around the footprint of the proposed scheme. No carpet sea squirt were recorded during the survey. Given this, and adherence to Stena Line's biosecurity plan, a **minor adverse** significance on the spread of the invasive carpet sea squirt was predicted.

5.6 Ornithology

The proposed scheme is located within the Anglesey Terns / Morwenoliaid Ynys Môn Special Protection Area (SPA), which is designated for foraging terns. It is also within close proximity of Holy Island Coast / Glannau Ynys Gybi SPA and Site of Special Scientific Interest, designated for the wintering and breeding

population of chough *Pyrrhocorax pyrrhocorax*, plus a section of Chwarel Morglawdd Caergybi Local Wildlife Site (LWS).

Given the level of current activity surrounding the proposed scheme, given the close proximity of Holyhead Port and moorings within the New Harbour, disturbance impacts on foraging birds would be **negligible**.

In the event that Salt Island is used to site a batching plant for the concrete armour units, there is potential for disturbance to breeding black guillemot within the port area; however, in the context of the port operations the magnitude of disturbance events are anticipated to be low. The potential impact is considered to be of **minor adverse** significance.

Given the regular use of the structure by the public, it is unlikely that there would be significant use of the Breakwater or Soldier's Point by nesting birds; however, appropriate measures will be put in place to ensure that nesting birds are not affected. As such, potential impacts to breeding birds are considered to be **minor adverse** significance.

5.7 Terrestrial Ecology

The Terrestrial Ecology assessment was informed by a desk-based review of available information. Part of the Chwarel Morglawdd LWS adjoins Soldier's Point at its most south west corner. The habitats within the area of Soldier's Point that would be used as a laydown and storage area are of low importance (see photo to the right). Protected species including bats, badger and common reptile species have been recorded in the vicinity of the proposed scheme's boundary. In addition, the invasive non-native species Japanese knotweed has been recorded within the proposed scheme's boundary.



Photograph of Soldier's Point, looking towards the Breakwater

To prevent any potential impacts to the LWS, a 20m fenced buffer zone around the LWS has been recommended. With this mitigation in place, the residual impact to the LWS is considered to be **negligible**.

Potential impacts to foraging and commuting bat species as a result of increase lighting and human activity are considered **minor adverse** significance. To reduce potential impacts to bats, temporary artificial lighting would be directed away from potential bat commuting areas; following these measures the residual impact remains **minor adverse** significance.

Potential impacts to common reptile species are also considered to be **minor adverse** significance. To ensure common reptile species are protected, a precautionary method of working has been recommended; following these measures the residual impact is considered to be **negligible**.

To prevent the spread of Japanese knotweed, an invasive species survey and management plan has been recommended that includes on-site training and biosecurity measures. The residual impact is considered to be **minor adverse** significance.

5.8 Visual Setting

The Visual Setting assessment used photomontages from selected representative viewpoints to illustrate the proposed scheme. Potential for significant visual effects would be limited to receptors located to the south and west of the Breakwater. These include recreational users of the Isle of Anglesey Coastal Path, the Breakwater, walkers and other users of Holyhead Mountain.

During construction, **moderate adverse** visual effects would be experienced by users of the coastal path and margins that are in close proximity to the proposed storage facilities located on Soldier's Point. Tall structures and crane activity would be seen high in the skyline, strongly affecting both local and distant views to surrounding, attractive features. More distant construction activity alongside the Breakwater would not incur **minor adverse** / **negligible** effects, seen in context of the existing harbour and regular movements of vessels and other related activity. Construction stage effects would be short term and reversible.

During operational phase, **moderate adverse** visual effects have been identified. These specifically relate to close range, landside receptors on the rocky headland and beach to the west Soldier's Point (that obtain views to the seaward side of the Breakwater) and in views obtained from the Breakwater itself, in particular from the head of the Breakwater looking towards Holyhead Mountain. Potential effects during operation would be permanent. In the long term, the visual prominence of concrete armament units would be slightly reduced due to the effects of weathering, sea action, general patination and limited displacement of Tetrapods. There would be **negligible** effects to views, or the character of views, obtained from within the Anglesey AONB.

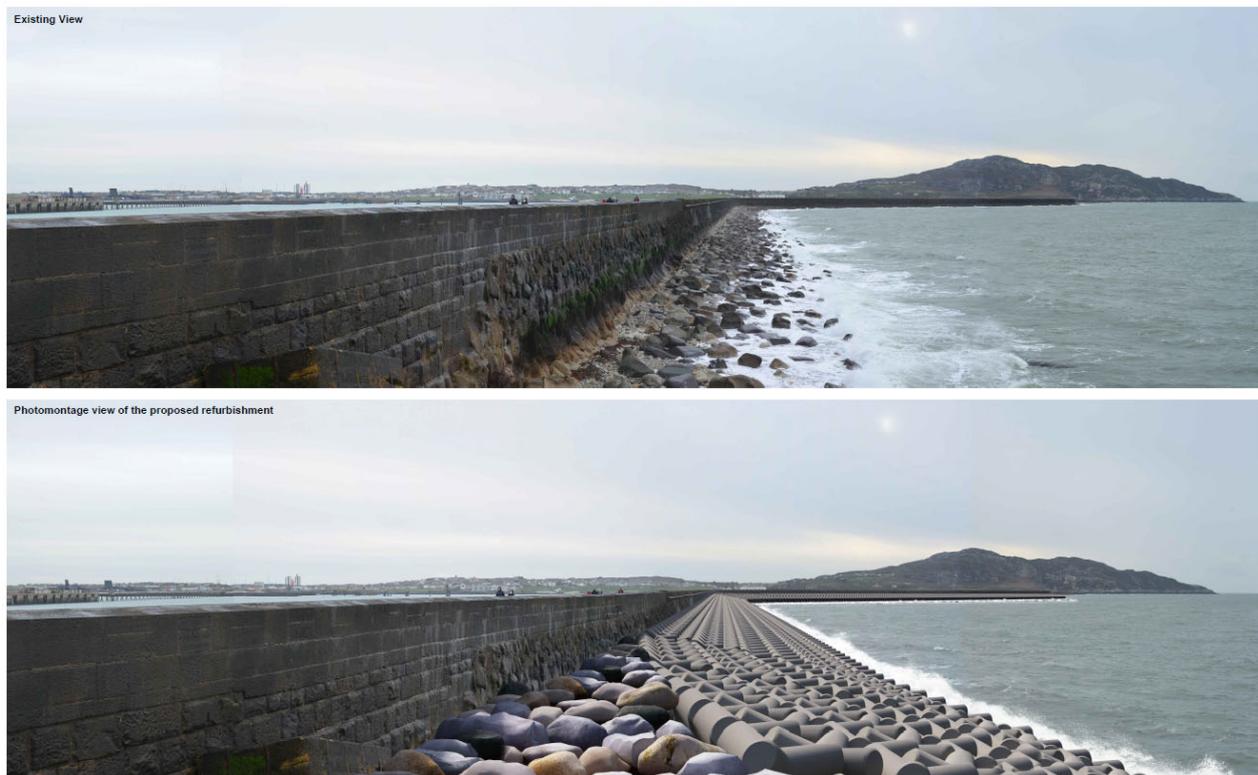


Plate 5-1 Looking south west from the head of Holyhead Breakwater towards Holyhead Mountain



Plate 5-2 Looking north east from Holyhead Breakwater, approximately 800m from shore



Plate 5-3 Looking north east from headland near Ynys Wellt on the Isle of Anglesey Coastal Path

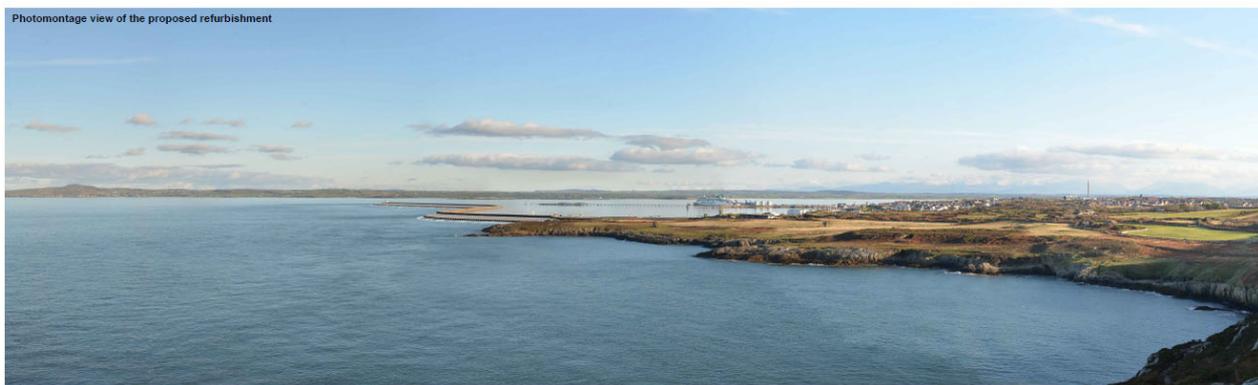


Plate 5-4 Looking east across Porth Namarch Bay from the Isle of Anglesey Coastal Path

5.9 Cultural Heritage

The Cultural Heritage assessment has been informed by a desk-based assessment, settings assessment and a review of drop-down video footage.

The proposed scheme would provide a permanent solution to the constant erosion of the foundations of the Breakwater and damage of the blockwork-walled superstructure; therefore, preventing the potential loss of the Breakwater and Lighthouse. As such the proposed scheme is considered to have a potential impact of **major beneficial** significance on the physical Grade II* Breakwater and Grade II Lighthouse.

Beyond the Breakwater and Lighthouse, direct physical impacts to heritage assets are not anticipated to occur. It has been recommended that during the construction phase, high visibility fencing is placed around Soldier's Point House to prevent accidental damage to the structure during the movement of materials. Similarly, has been recommended that Archaeological Exclusion Zones be placed around three named wrecks and that no activities which make contact with the seabed (i.e. placement of jack-ups or anchors) are undertaken within these boundaries.

For all other archaeological material which may be present on the seabed, it is recommended that an archaeological reporting protocol be adopted to mitigate the potential impact arising from construction activities. Ensuring that any new discoveries are quickly and efficiently reported and addressed through the protocol would result in a residual impact of **minor adverse** significance.

With regard to the setting of designated heritage assets, other than to the Breakwater and Lighthouse, the heritage significance of assessed assets would not be affected to a significant degree. With respect to the Breakwater and Lighthouse themselves, whilst the ACBM solution on the leeward side will have no impact

upon heritage significance, the introduction of Tetrapods along the seaward side would adversely affect the visual character of the historic assets.

A Level 4 building record has been produced that provides a detailed account of the Breakwater and its significance and, as such, in itself represents a primary form of mitigation for the Breakwater and Lighthouse. In the long term, the visual prominence of Tetrapods would be reduced due to the effects of weathering, algal growth and general patination. In addition, storm and exceptional sea conditions will cause some displacement to the Tetrapods, which will provide minor visual relief to the otherwise highly regimented, linear arrangement of the units. As such the residual impact is considered to be of **minor adverse** significance.

5.10 Climate Change

The Climate Change assessment considered the contribution of the proposed scheme to national greenhouse gas (GHG) emissions, and its resilience to the projected effects of climate change. As part of the assessment, a description of the current baseline GHG emissions within the Anglesey area was provided, along with a summary of the current climatic conditions in the region.

GHG emissions were quantified from construction phase activities, including 'embodied carbon' within concrete and rock to be used for the proposed scheme. In addition, GHG emissions were quantified from the use of construction plant and equipment, delivery of materials by vessel and road vehicle movements. The results from the assessment showed that GHG emissions arising during construction would not result in a significant impact on the UK's ability to meet its 2050 carbon reduction targets.

The climate resilience assessment identified that the parameters most likely to affect the proposed scheme as a result of climate change was sea level rise and storm surges. The design of the proposed scheme has taken into account a 1 in 100-year wave height, combined with a 1 in 100-year storm surge and 50 years of sea level rise. It is therefore considered to be very unlikely that impacts to the proposed scheme associated with sea level rise and storm surges would occur.

5.11 Cumulative Impact Assessment

Cumulative Impact Assessment (CIA) was undertaken on other projects that could result in cumulative impacts with the proposed scheme. The other projects included in the CIA were:

- Holyhead Waterfront Development;
- Maintenance Dredging at Holyhead Port;
- Holyhead Port Expansion;
- Parc Cybi Stage 2;
- Penrhos Leisure Village;
- Anglesey Eco Park;
- West Anglesey Demonstration Zone;
- Business units at Penrhos;
- Residential development at South Stack Road (Phase 1);
- Residential development at South Stack Road (Phase 2);
- Builders Merchant Yard; and,
- Wylfa Newydd New Nuclear Power Station.

The CIA concluded that there would be **no cumulative impacts** arising from the proposed scheme and any of the identified projects.

5.12 Water Framework Directive Compliance Assessment

A Water Framework Directive (WFD) compliance assessment was carried out in line with NRW guidance for assessing activities and projects for compliance with the WFD (OGN72) and the Environment Agency's Clearing the Waters for All guidance.

The assessment concluded that the proposed construction and operational activities associated with the proposed scheme would **not cause a deterioration** within the Holyhead Bay or Carnarvon Bay coastal waterbodies or other interconnected water bodies. As a result, the proposed scheme was considered to be compliant with WFD requirements.

5.13 Shadow Habitats Regulations Assessment

A Habitats Regulations Assessment (HRA) was undertaken to assess the potential impacts of the proposed scheme to the following National Site Network (NSN) sites:

- Anglesey Terns / Morwenoliaid Ynys Môn SPA;
- North Anglesey Marine / Gogledd Môn Forol Special Area of Conservation (SAC); and,
- Holy Island Coast / Glannau Ynys Gybi SPA and SAC.

No likely significant effects were concluded, either alone or in combination with other projects, on the qualifying features and therefore the Conservation Objectives of the NSN sites listed above. As such, it is anticipated that there would be no requirement for NRW and the IoACC to undertake an appropriate assessment on the proposed scheme.