Alun Griffiths Contracting Ltd

Bangor Scour Protection Works

Coastal Squeeze Assessment Report

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1. Introduction

1.1 Overview

This document sets out the assessment of coastal squeeze which was identified as a potential impact as part of the Habitats Regulation Assessment (HRA) (APEM, 2025) for the scour protection works at the Bangor Beach Road Sewage Pumping Station, North Wales (henceforth known as 'Bangor scour protection works' or 'proposed works'). The works involve the use of rock armour between the existing revetment (approximately 40 m^2) and newly installed sheet piles on the foreshore, to act as a sea defence and protect local communities from storm events, coastal erosion and damage from sea flooding. More information on the proposed works can be found in Section 2.

This document has been prepared to support the Marine Licence application for the Bangor scour protection works (reference CML2541), and to inform the HRA in terms of potential adverse effects caused by coastal squeeze on the Annex I habitats of the Menai Strait and Conwy Bay Special Area of Conservation (SAC). The report provides the information required by Natural Resources Wales (NRW) to fulfil its function as a 'Competent Authority'.

1.2 Coastal Squeeze Requirements

Coastal squeeze is defined as the loss of natural habitats or deterioration of their quality arising from anthropogenic structures, or actions, preventing the landward transgression of those habitats that would otherwise naturally occur in response to sea level rise in conjunction with other coastal processes. Coastal squeeze affects habitat on the seaward side of existing structures. A full definition can be found within the NRW Guidance Note GN 062 (NRW, 2022).

Maintaining the existing alignment of the coastline through the provision of new hard defences has the potential to cause coastal squeeze whilst sea-levels continue to rise potentially narrowing the intertidal/coastal zone and causing loss of habitat. While a HRA assesses whether designated Annex 1 habitats are stable or increasing (as per their conservation objectives) in relation to proposed works, some works may prevent the natural ability of habitats to migrate landwards in response to sea-level rise, which are likely to lead to adverse effects or deterioration of the UK National Site Network. To address these concerns, NRW introduced a Coastal Squeeze Assessment requirement in 2022 to better understand and manage the risks associated with habitat loss due to coastal squeeze.

A coastal squeeze assessment was deemed appropriate for the proposed works to assess if there would be any subsequent loss of Annex I habitats in the Menai Strait and Conwy Bay

SAC caused by maintaining the existing and proposed sea defences during Epoch 2 and Epoch 3 (Royal Haskoning, 2011b). This assessment has been carried out following NRW Guidance Note GN 062, which sets out the steps to be followed in assessing coastal squeeze. It has also been informed by the Joint Flood and Coastal Erosion Risk Management Research and Development Programme report *What is coastal squeeze?* (Pontee *et al.,* 2021).

2. The Proposed Works

2.1 Location and Context

The scour protection works will be installed at the top of the beach at Bangor Promenade to the northeast of Bangor, north Wales. The site is located on a grassed recreation ground (used as a football pitch) bounded by Beach Road to the south and the seafront promenade to the north-east. To the west, the Site is bounded by a car park and a small building housing changing rooms and a pump station. Approximately 200 tonnes (T) of excavated beach material will be stockpiled above Mean High Water Springs (MHWS). The scour protection works will occur across an approximate 40 m^2 area along the seawall to protect the revetment works.

The wider project site location is indicated in Figure 1 and is centred at National Grid Reference 258704 372826.

2.2 Wider Project

The Proposed Works are part a wider project known as The Welsh Water Menai Shellfish project, which is aimed at improving the Storm Overflow performance from the Bangor Beach Road Sewage Pumping Station (Treborth Catchment, Bangor). This pumping station is one of four assets that fall under the Asset Management Plan (AMP) 7 National Environmental Programme (NEP) to meet the Shellfish Water Directive of a maximum of 10 spills per year for the Menai Strait.

A Root Cause Assessment (RCA) was undertaken for the whole catchment which led to a focus on Bangor Beach Road. The assessment report summarises the findings from the catchment wide investigations, hydraulic modelling and outlines the proposed interventions to reduce spills to the Menai Strait Shellfish waters.

The Treborth catchment has one wastewater treatment works, which serves a population of 20,668. The wastewater network consists of a foul gravity collection system with pockets of combined storm sewerage in discrete areas across Bangor. The gravity system is served by seven key sewage pumping stations (each with a consented storm overflow) which discharge to Treborth wastewater treatment works.

The wider project will include:

- A new 4,300 m^3 storage tank below an adjacent football pitch, with cleaning systems optimised for minimal maintenance requirements. The tank is to be designed to operate with buried covers.
- Gravity storm tank return (with a discharge flow control) to a manhole upstream of the pumping station and Emergency Overflow from the tank back to a pump well. The return flow control is to be linked to the pump inlet levels and is optimised to empty the tank as quickly as possible without causing recirculation or premature spills.
- The gravity return flow control will be designed to prevent flow recirculation and overflow.
- Scour protection of revetment works (approximately 40 m^2) will be installed to protect the structure, including excavation of beach material.

Figure 1. The location for the overall wider project.

2.1 Marine Licensable Works

The objective of the Bangor scour protection works which are subject to this assessment and licence application is to improve the storm overflow performance from the Bangor Beach Road Sewage Pumping Station to comply with the Shellfish Water Directive. Part of these works will include providing scour protection between the existing revetment (approximately 40 m^2) and newly installed sheet piles on the foreshore. The aim will be to complete the scour protection works by September 2025, with the design having a lifetime of 50 years.

The scour protection works and works below MHWS (the licensable works) will include the following:

- Excavation of granular material from the scour protection work area will be conducted using a tracked excavator with demolition cab to the specified depth (to be confirmed with final design).
- All excavation works will occur during good weather and during low tide periods (Griffiths, 2025a).
- All material will be removed off the beach via forward tipping dumper (FTD) (approximately 200 T) to be stockpiled in the main site compound away from the work area above MHWS.
- Rock armour for the scour protection will be loaded into the FTD at the loading area and transported across the beach and tipped into the material laydown area, the transportation of the material across site will be below the MHWS line, however, the loading area and laydown area will both be above MHWS. There are two sizes of rock that will form the scour protection with the underlayer rock material being 0.408 m in diameter and the primary surface layer of rock being 0.626 m in diameter.
- The rock armour used for the scour protection works will be cleaned and jet washed prior to installation to reduce the risk of any residual silt entering the marine environment and the spread of invasive non-native species.
- The FTD will travel along the designated route from the ramp onto the beach at Beach Road East car park to the works area. All heavy machinery operations will occur during low tide periods to minimise risks of flooding and provide a stable work surface (Griffiths, 2025a).
- The ground level at the foot of the revetment will be raised to the specified level using the core ground material (exact material to be confirmed by final design). This will form the base of the scour protection (see Figure 2).

- The underlayer of rock will be placed on top of the core ground material using the grab attachment on the excavator in two layers. The primary layer of rock will then be placed on top of the underlayer, also using the excavator grab attachment, until the whole area has been covered (see Figure 2).
- Once the scour protection system has been constructed, the surrounding area will be carefully reinstated to the original level and to the original state prior to works being carried out, using the stockpiled excavated material.

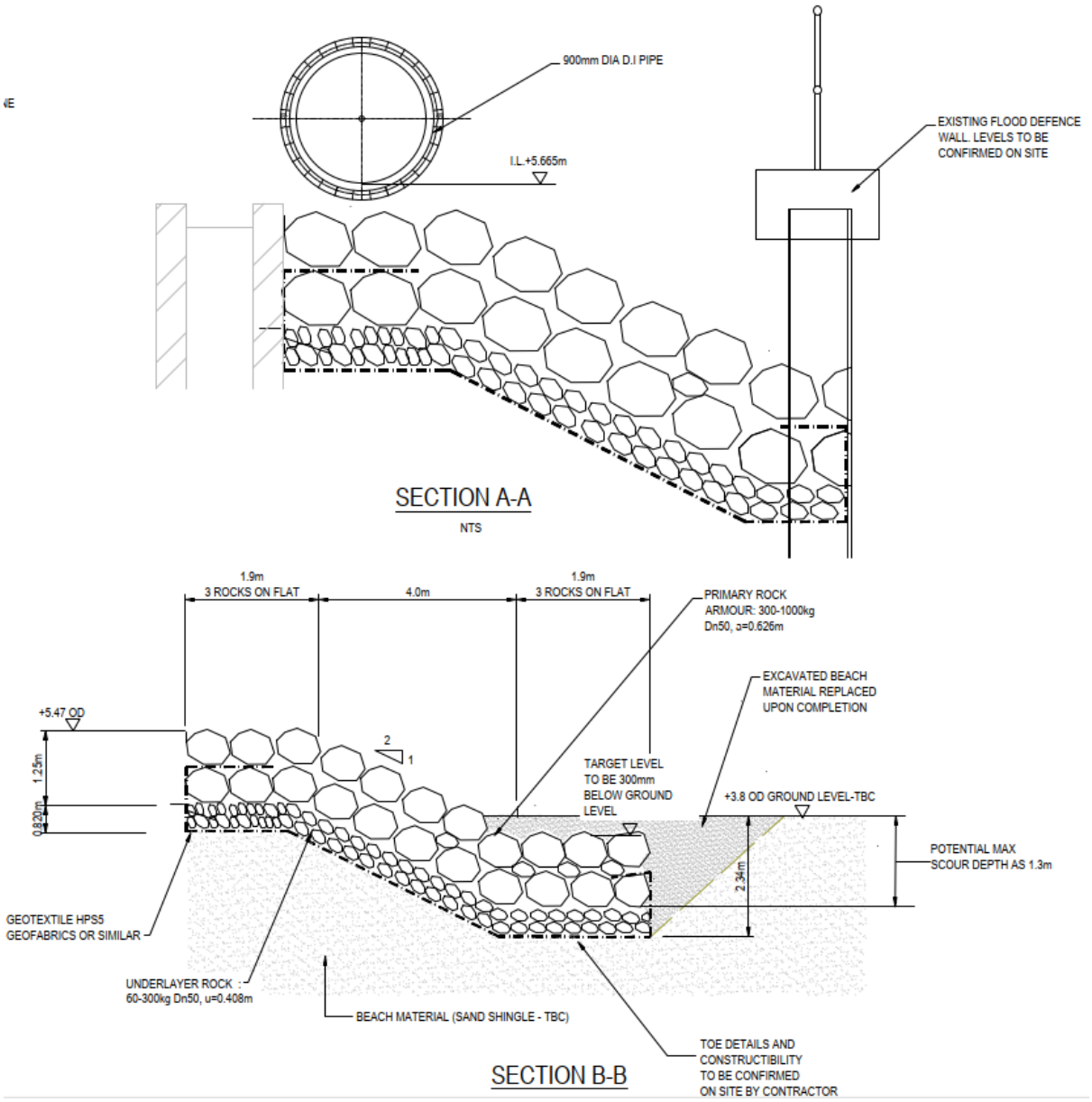

Figure 2. Cross section of the scour protection works (source: Griffiths, 2025a)

Overall, the proposed works aim to consolidate the existing defence with rock armour.

2.3 Designated Sites

As identified in the HRA, there are several designated sites in the area. These include:

- Traeth Lafan/ Lavan Sands, Conway Bay Special Protection Area (SPA) – designated for several Annex II species of birds; and
- Y Fenai a Bae Conwy / Menai Strait and Conwy Bay Special Area of Conservation (SAC) - designated for Annex I habitats including intertidal mudflats and sandflats.

These designated sites are shown in Figure 3. For the coastal squeeze assessment only Menai Strait and Conwy Bay Sac is relevant to the assessment, with Annex 1 habitat features.

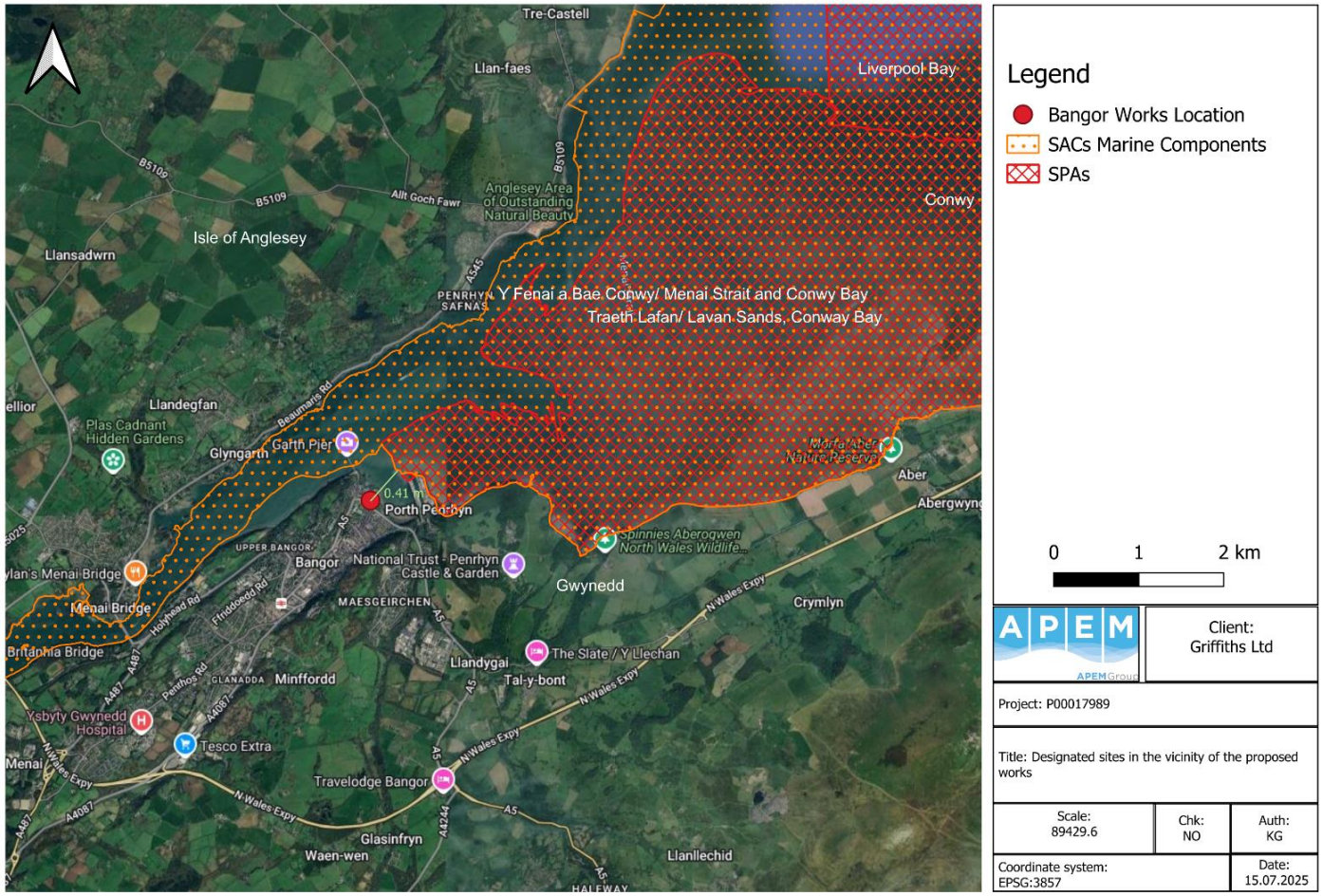

Figure 3. Designated sites near the proposed works.

3. Shoreline Management

Shoreline Management Plans (SMPs) are non-statutory, high-level policy documents for coastal flood and erosion risk management planning, covering the whole of the Welsh and English coasts. There are four plans that relate to the Welsh coast. Whilst non-statutory, they are key to the Welsh Government's strategic approach to managing coastal risk. SMPs do not set policy for anything other than Flood and Coastal Erosion Risk Management (FCERM) but are a material consideration in other forms of development which rely on coastal planning and are referenced in Planning Policy Wales and associated advice (TAN15) (Welsh Government, 2021).

SMPs provide a high-level assessment of the risks from coastal erosion and coastal flooding to individuals, communities, the natural environment and heritage. They forecast the increasing risks due to climate change, such as sea level rise, and provide sustainable, long-term coastal management policies, taking into account social, economic and environmental assets. Preferred management scenarios are proposed over the short (0-20 years), medium (20-50 years) and long term (50-100 years), knowns as 'Epochs', with short term being Epoch 1, and long-term being Epoch 3. SMPs identify four flood and coastal risk management policy options which are:

- Hold the line of existing defence (HTL);
- Advance the line of existing defence (ATL);
- Managed realignment/retreat (MR); and
- No active intervention (NAI).

A policy option is provided for each of the three epochs for each stretch of coast and can change for different epochs for the same stretch of coast.

The proposed works are located within SMP West of Wales Shoreline Management Plan 2 – St Ann's Head to Great Ormes Head, Coastal Zone F, Policy Development Zone 16. The proposed works fall within Policy Unit 16.28. With the wider project impacts, Policy Unit 16.27 has also been considered.

3.1.1 Policy Unit 16.27 and 16.28

The Policy Plan for the short (2005-2025), medium (2025-2055) and long-term policies (2055-2105) are shown in Table 1.

Table 1. Policy Plans for Policy Unit 16.27 and 16.28 (source: Royal Haskoning, 2011b)

	Epoch 1 (2010 – 2025)	Epoch 2 (2025 – 2055)	Epoch 3 (2055 – 2105)	
Policy Unit 16.27	HTL	HTL	HTL	
Policy Unit 16.28	HTL	HTL	MR	Consider options for re-development and flood proofing

Table 2. Preferred policy to implement SMP (source: Royal Haskoning, 2011b)

Preferred policy to implement plan	
From present day	Maintain existing defences. Develop adaptation planning. Develop funding plan.
Medium term	Maintain defences while moving towards adaptive management.
Long term	Implement plans for realignment and development.

As seen in Table 1, the project falls under the "Hold the Line" policy for Epoch 2, whereas for Epoch 3, the policy changes to "Managed Realignment". The reasons for the policy selections are to ensure the long-term conservation objectives of SACs, but also to protect important social, economic and national transport infrastructure, that also form a key element of the social and economic infrastructure of the surrounding areas (Royal Haskoning, 2011a).

The proposed development has a design life of 50 years, so considering the proposed works in relation to the SMP, the works fall within Epoch 2 and continues into Epoch 3 but does not reach the end of the timeline of Epoch 3.

For Epoch 2, HTL is necessary along some frontages to protect access within and amongst surrounding communities or even at the regional and national level, or to maintain the economic function of specific locations that support surrounding communities. With the introduction of Epoch 3 changing to MR there may be scope to realign the existing sea defence. In the local area there would be significant increase in flood risk[1] with sea level rise and the SMP recommends long term planning for realignment and redevelopment of the low-lying basin to provide a more secure future for development in the area (Royal Haskoning,

[1] Flood and Coastal Erosion Risk Maps

2011b). To deliver this plan, the SMP HRA advises this area to consider options for re-development and flood proofing (Table 1). MR has been recommended in Epoch 3 to provide sufficient time and programming for national bodies to develop the appropriate methodology for realignment of settlements and related infrastructure (Royal Haskoning, 2011b).

There is scope for some realignment of existing defences where they begin to fail (even though HTL is the stated policy) in PDZ 16, and where there is space to realign inland, this should be explored during scheme level development, thereby reducing the potential extent of coastal squeeze on intertidal interests (Royal Haskoning, 2011a).

At present there is no predicted habitat loss for Policy Units 16.28 or 16.27 as concluded in the HRA of the SMP (Royal Haskoning, 2011a), therefore potential habitat losses for these Policy Units have not been calculated.

By ensuring scour protection in this area, consolidating the existing defence with rock armour and replenishing the beach, it can be considered that a HTL approach is being taken, for both the short and medium term as per the preferred policy to 'maintain defences' (Table 2). In the long term, the preferred policy is to 'implement plans for realignment and development', however the proposed works have a design life of 50 years and so will not fulfil the timeline of Epoch 3.

4. Coastal Squeeze Screening

4.1 Screening Assessment Stages

The assessment for coastal squeeze goes through a number of stages, with guidance having been published to aid competent authorities to fulfil their responsibilities (NRW, 2022). Those stages are summarised in Figure 4.

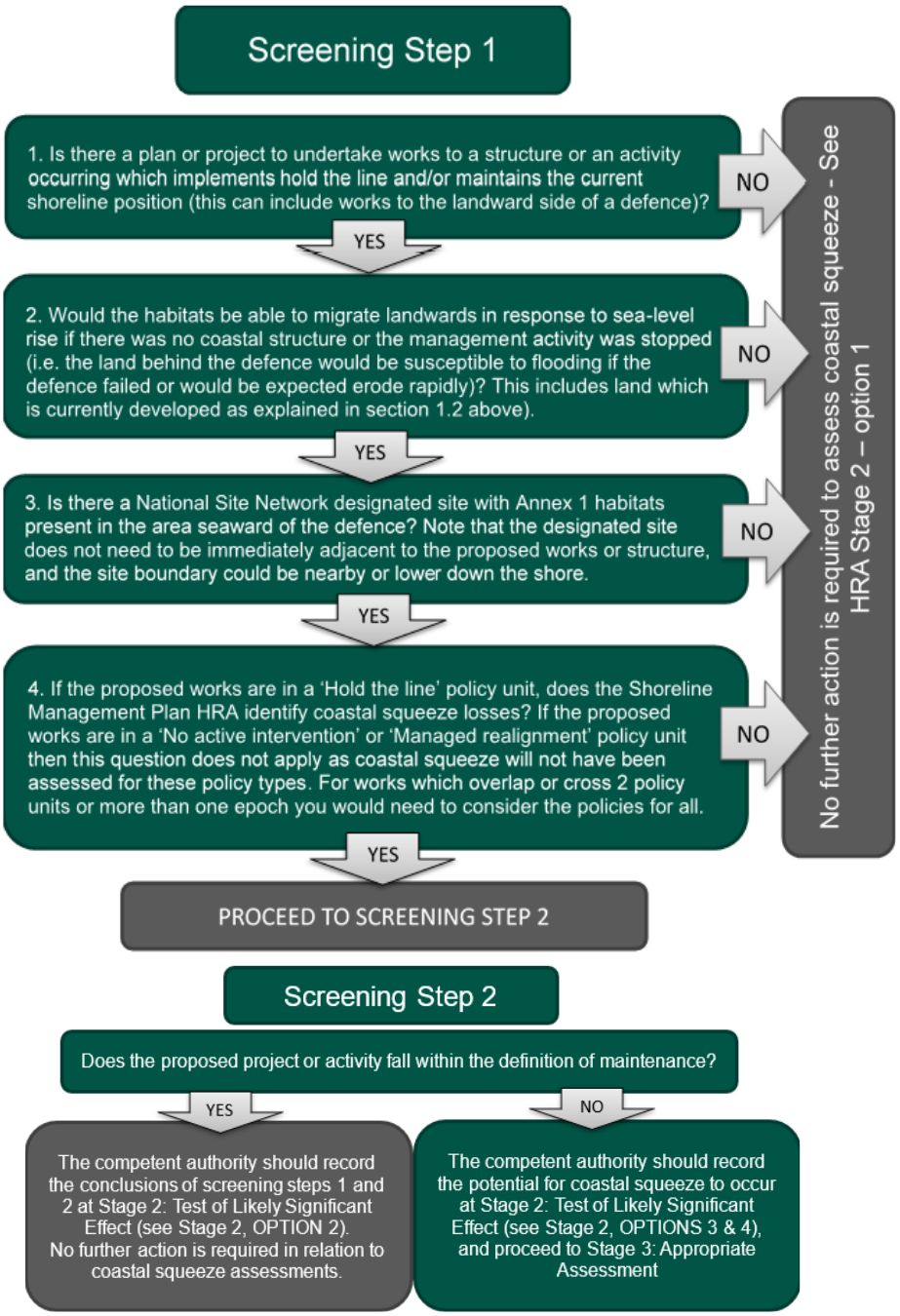

Figure 4. Stages in the Coastal Squeeze Screening process

4.2 Screening Step 1

Table 3. Questions and responses for coastal squeeze screening step 1 of GN 062.

Stage 1	Question	Responses
1.1	Is there a plan or project to undertake works to a structure or an activity occurring which implements hold the line and / or maintains the current shoreline positions (this can include works to the landward side of a defence)?	**Yes.** The scour protection works maintain the current shoreline position by prevent erosion long term.
1.2	Would the habitats be able to migrate landwards in response to sea-level rise if there was no coastal structure or the management activity was stopped (i.e. the land behind the defence would be susceptible to flooding if the defence failed or would be expected to erode rapidly)? This includes land which is currently developed.	**Yes.** The intertidal area seaward of Bangor is considered a high flood risk from the sea[2].
1.3	Is there a National Site Network designated site with Annex 1 habitats present in the area seaward of the defence? Note that the designated site does not need to be immediately adjacent to the proposed works or structure, and the site boundary could be nearby or lower down the shore.	**No.** The Menai Strait and Conwy Bay SAC has Annex 1 habitat features present seaward of the proposed development. However, the intertidal section adjacent to the proposed works is not designated within the Menai Strait and Conwy Bay SAC which is located over 400 m further down the shore (see Figure 3). NRW Marine Advisory Team (pers comm. 2025), have advised that the Annex I habitats within the SAC are not considered 'nearby' and as such, there is no potential for effects to these habitats from coastal squeeze.

[2] Flood and Coastal Erosion Risk Maps

1.4	If the proposed works are in a 'Hold the Line' policy unit, does the Shoreline Management Plan HRA identify coastal squeeze losses? If the proposed works are in a 'No active intervention' or 'Managed realignment' policy then this question does not apply as coastal squeeze will not have been assessed for these policy types. For works which overlap or cross 2 policy units or more than one epoch you would need to consider the policies for all.	**N/A** as screened out in 1.3 above.

Figure 5. HRA Stage 2 option 1 outcomes.

As the proposed works are not considered likely to cause coastal squeeze (Figure 5), the works have been screened out at Screening Stage 1, Level 3. As such, there is no further action required to assess coastal squeeze as there is no impact pathway. Any in-combination impacts have been assessed in the HRA (APEM, 2025).

5. Conclusions

A coastal squeeze assessment is required to inform other supporting assessments, in this case the HRA, to identify any potential effects of coastal squeeze on Annex I habitats from the Bangor scour protection orks

There is no predicted habitat loss for Policy Units 16.28 or 16.27 (Royal Haskoning, 2011a). As sea levels rise intertidal habitats 'migrate' landwards, there is the potential that this will lead to intertidal habitats being 'squeezed' against the hard defence and eventually lost. However, the proposed works were screened out as they were not considered to be close enough to affect the designated Annex I habitats of the Menai Strait and Conwy Bay SAC. By renewing the sea defence in this area, consolidating the existing defence with rock armour, a HTL approach is being taken. Within Epoch 3 options are open for future flood proofing. Any in-combination effects have been assessed in the HRA (APEM, 2025).

The coastal squeeze assessment therefore has concluded that there was would not be a coastal squeeze impact caused by the Bangor scour protection works on Annex I habitats over the lifetime of the scheme.

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