

Record of a Habitats Regulations Assessment of a project

OGN 200 Form 1

Document owner: Protected Sites Team, EPP

Version History:

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1.0	March 2016	Document created
1.1	30 November 2017	References to the 2010 Habitats Regulations updated to reflect new consolidated version of the regulations which entered into force on 30 th November 2017; References to KSP and National Services Directorates updated to EPP
1.2	28 June 2018	With marked up changes in light of ruling in CJEU case c-323/17 'People over Wind'.
1.3	27 June 2019	With marked up changes in light of ruling in CJEU case c-323/17 'People over Wind'. See Guidance here

Next review date: April 2019

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1. Project Details

1(b): Project details where NRW is the project proponent/instigator	
NRW Project reference	Rhymney Great Wharf Habitat Restoration Polders Enhancement Project
Activity proposed	<i>Brief description of the activity</i> <u>Background</u> Natural Resources Wales (NRW) have commissioned Ove Arup and Partners Ltd. (Arup) to assist in the Project aiming to restore and enhance important saltmarsh habitats along the Rhymney Great Wharf on the coast of the Gwent Levels, approximate grid reference ST 23126 77613 to ST 24992 78619 (Refer to Annex A- Environmental Constraints and Opportunities Plans (ECOPs)). The initial scope of the commission included a Scheme Definition stage to develop on a previous feasibility study (NRW Evidence Report 528) and to identify a single option for development at detailed design stage. Figure 5 in the NRW report shows that saltmarsh that was present along the more westerly part of this frontage in the 1950s has now gone, and that the mudflat in this location has lowered over time. Therefore, both saltmarsh and mudflat habitats are under pressure in this location. In this report and in relation to this project, polders are defined as fences constructed of brushwood materials (e.g., willow branches) inserted between chestnut fence posts in a rectangular pattern across the mudflat at an appropriate elevation and height to facilitate accretion of sediment (c.3m below Mean High Water Springs – MHWS). The saltmarsh at Rhymney Great Wharf has been subject to a long-term erosive trend, and past interventions to stop or slow this erosion have been undertaken in the form of brushwood polder fencing. Currently there are five existing polders along Rhymney Great Wharf (Polders 1-4 constructed in 2005 and Polder 5 constructed in 1999). The polders have received little or no maintenance since construction and the brushwood is no longer present to facilitate trapping of sediment; as such, the polders are no longer functioning. The polders have been successful to some extent in reducing hydrodynamic energy and erosion, allowing sediment to settle and some expansion of saltmarsh in the more easterly polders. However, as erosion continues along the frontage, Natural Resources Wales (NRW) are keen to employ nature-based solutions which could aid in restoring saltmarsh and mudflats in this location. Diverse, healthy and extensive saltmarshes in this location are important not only for nature conservation reasons, but also because they provide protection for flood embankments, as well as providing other significant ecosystem services. This also links to the Environment (Wales) Act 2016 which aims to build the resilience of Welsh ecosystems – in particular the following aspects (known as the DECCA Framework): • diversity between and within ecosystems; • the connections between and within ecosystems; • the scale of ecosystems; • the condition of ecosystems (including their structure and functioning); and, • the adaptability of ecosystems. This focus on resilient ecosystems aims to help create jobs; support livelihood and human well-being; adapt to the adverse

	impacts of climate change; and contribute towards sustainable development,. The Project is currently at detailed design stage. The assessment may need to be reviewed should the basis for design and construction methodology change significantly. <u>Aims and objectives</u> Rhymney Great Wharf Polders seeks to re-establish and enhance important saltmarsh and mudflat habitats along the Rhymney Great Wharf by replacing existing degraded polders and extending the polder system to the west. Tidal currents are slowed by the polder fences, and wave energy reduced, so that sediment can more easily settle out of the water column and encourage accretion that maintains the mudflats and supports saltmarsh regeneration. This will seek to provide a multitude of outcomes and benefits, including for biodiversity, flood protection and carbon sequestration. The following objectives have been agreed by the project: • Sediment accretion. • Vegetation establishment (saltmarsh). By repairing and extending the polders along this frontage, the aim is to promote sediment deposition in the first instance, to reduce or ideally reverse the erosive trends currently being experienced. This should have benefits for the mudflat feature overall, and then saltmarsh should develop in areas where conditions allow. Over time, with sea-level rise, the saltmarsh that has developed within the repaired/extended polders may be unable to accrete vertically quickly enough to keep pace with rising water levels. With increased tidal inundation, storms / wave action could be more impactful and promote increased erosion. At this point an increase in mudflat and saltmarsh loss may be observed demonstrating the anticipated spatial flux between these important inter-related habitats over time. It has been estimated that over time there is potential for up to 5.4 hectares (Ha) of saltmarsh gain¹. Successful delivery will promote the restoration of saltmarsh (Atlantic salt meadow - <i>Glauco puccinellietalia maritimae</i>), which is a defined feature of the Severn Estuary / Môr Hafren Special Area of Conservation (SAC) and the underpinning Severn Estuary / Môr Hafren Site of Special Scientific Interest (SSSI), functional supporting habitat of the Severn Estuary / Môr Hafren Special Protection Area (SPA) and Severn Estuary / Môr Hafren Ramsar site, a Priority Habitat of Principal Importance in Wales, a critical nursery and spawning habitat for fish, a highly efficient carbon sink, and will support coastal resilience by reducing erosional forces and encouraging further accretion. Whilst the primary focus of this project is to restore the saltmarsh feature, the project is also likely to support the <i>mudflats and sandflats not covered by seawater at low tide</i> feature by retaining sediment and also retaining or restoring transition zones between the two habitats.
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¹ These calculations have been produced by the client, NRW, the full details of these calculations have not been detailed within this report, however, it has been determined that the data was derived from the latest saltmarsh extents layers (data derived from the following online source https://datamap.gov.wales/layers/inspire-nrw:NRW_SALTMARSH_EXTENTS) by calculating the proposed polders area and taking the conservative assumption that everything that is not saltmarsh is mudflat, which would result in 5.4ha of potential saltmarsh gain / mudflat loss. This may be an overestimate of loss as there is transitional habitat within this measure.

	An additional benefit of the project is to provide incidental resilience to existing flood risk infrastructure. There is already a significant embankment in this location, and works have been undertaken previously to place rock armour at the edge of the saltmarsh and within creeks to protect the remaining saltmarsh that is present. There is significant flood risk behind the structure and the long-term Shoreline Management Plan (SMP) policy is Hold the Line. Restoration of saltmarsh should help to delay more significant investment / works to the more formal / traditional hard engineering flood risk infrastructure, which would likely involve raising the embankment, and protection works to the toe of the structure due to mudflat / saltmarsh erosion. These alternatives may be needed eventually, but the incidental benefits of saltmarsh reducing incidental wave energy may provide an opportunity to delay a project of that nature, and potentially avoid it. <u>Construction activities</u> An outline construction methodology has been developed to inform this assessment; a summary is provided below. • The scheme will be constructed using specialist plant operating on the foreshore. This will be a combination of low ground pressure tracked and amphibious plant, selected to suit the soft underlying ground. Specialist plant means that effects on intertidal habitat will be minimal and recovery is anticipated within a short timeframe. • Plant will access the site area using the existing access routes from Wentlooge Avenue, subject to agreement with third party landowners. Minor works may be required to widen accesses through fences or to create passing places. • A new temporary access ramp onto the foreshore will be required, crossing the existing revetment. This will be constructed from stone and would be removed following construction to allow for habitat recovery. • The Project will require temporary access onto the foreshore for the installation of wooden stakes to form the polders, utilising specialist tracked vehicles. Where possible, polder openings will align with existing naturally occurring channels to minimise disturbance to the sediment and work with natural processes. • Construction is planned to take place over the summer of 2024, to avoid the wintering bird season (October to March inclusive). A temporary storage compound location remains to be confirmed, but any temporary construction infrastructure will be located within areas of lower ecological sensitivity – informed by knowledge of existing habitats and agreed with NRW before construction starts, including any discussions around mitigation to reduce temporary effects, such as bog mats or aluminium trackways. • Each day's work will be planned around the tide times and predicted tidal heights, to ensure works are undertaken at low tide. Machine work can commence directly behind a falling tide and completed one hour in advance of a rising tide. • As the work is expected to be delivered over a period of approximately six weeks flexible working times will be adopted. • Standard construction environmental protection measures including for working near watercourses will be adopted and detailed within a Construction-phase Environmental Action Plan (EAP).
Statutory basis	Marine Licence granted by NRW Marine Licensing Team [pending]. Pending confirmation from Cardiff Council the project is anticipated to be undertaken under the following Permitted Development rights- GDPO 1995, Schedule 2, Part 2 Class A states "The erection, construction, maintenance, improvement or alteration of a gate, fence, wall or other means of enclosure" is considered PD, subject to the following; Development is not permitted by Class A if— (a)the height of any gate, fence, wall or means of enclosure erected or constructed adjacent to a highway used by vehicular traffic would, after the carrying out of the development, exceed one metre above ground level; (b)the height of any other gate, fence, wall or means of enclosure erected or constructed would exceed two metres above ground

	level; (c)the height of any gate, fence, wall or other means of enclosure maintained, improved or altered would, as a result of the development, exceed its former height or the height referred to in sub-paragraph (a) or (b) as the height appropriate to it if erected or constructed, whichever is the greater; or (d)it would involve development within the curtilage of, or to a gate, fence, wall or other means of enclosure surrounding, a listed building.
Location	Rhymney Great Wharf, Cardiff Rhymney Great Wharf is located approximately 5km to the north-east of Cardiff City Centre on the Severn Estuary foreshore, seaward of the Wentlooge Sea Defences (approximate grid reference ST 23126 77613 to ST 24992 78619)
NRW team responsible for carrying out the project, and name of lead officer	Marine Projects Team Chloe James Natura 2000 Sustainable Management Advisor – Marine
NRW team responsible for drafting this HRA report, and name of lead officer	Natural Resources Wales (NRW) commissioned Ove Arup and Partners Ltd. (Arup) to undertake a Habitats Regulations Assessment (HRA) to support the consenting of the project.
Project documents	Basis of Design 290063-ARP-00-RP-RP-ZX-0004 Preliminary Ecological Appraisal Preliminary Water Environmental Regulations (WER) Assessment stage 1 and 2 Environmental Action Plan (EAP)
Environmental Statement	EIA Screening Opinions confirming that the proposed restoration works are non-EIA Development were received from Cardiff Council (Reference No.: 23/02213/SCR) and NRW Marine Licensing Team (Reference No.: SC2305) on 16 October 2023 and 9 October 2023 respectively. No formal Environmental Statement is required.

2. Determining the need for a Habitats Regulations Assessment

2.1 Is the whole of the project directly connected with or necessary to the management of one or more Natura 2000 sites, for the purposes of conserving the habitats or species for which the Natura 2000 site(s) is/are designated?	YES
2.2 Is there a possibility that the project could affect a different Natura 2000 site to the one(s) the project is intended to conserve?	YES
2.3 Is it necessary to carry out an HRA?	YES

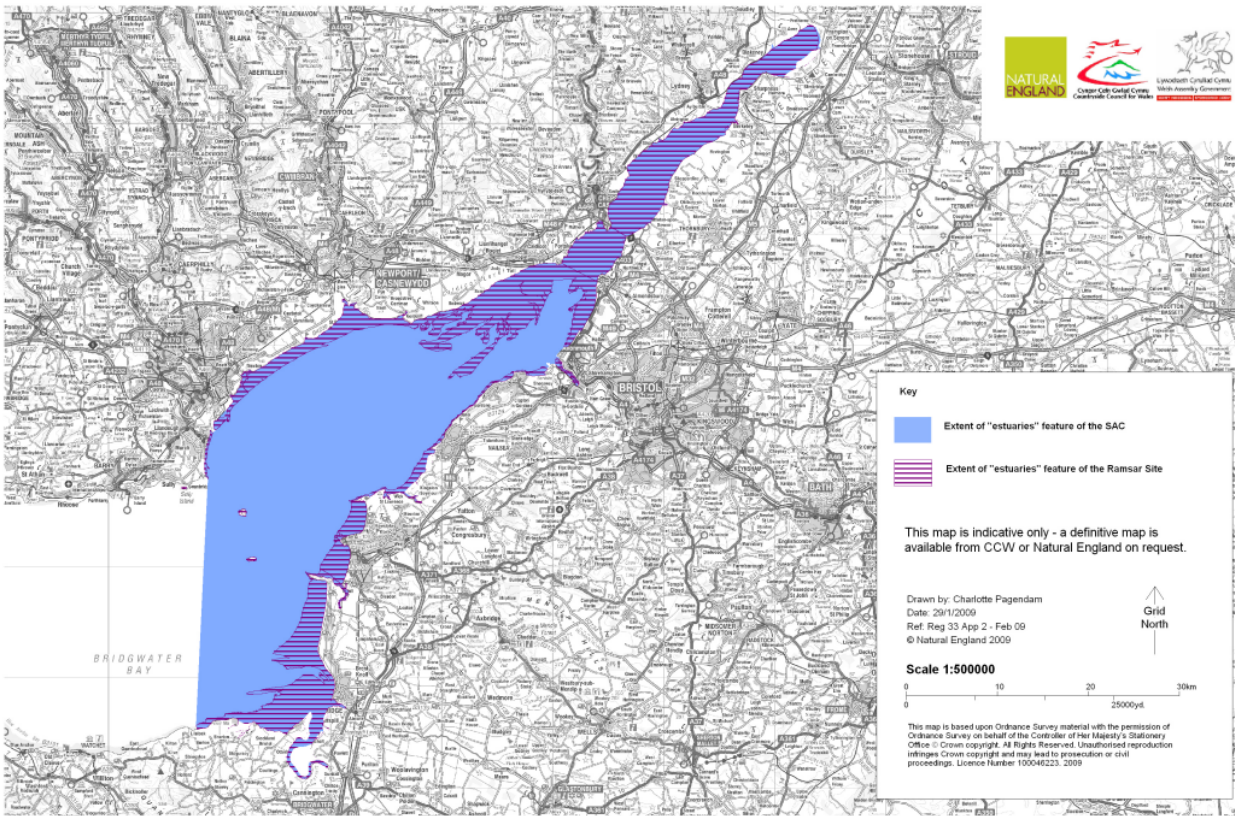
3. Considering the likelihood of a significant effect (LSE)

3.1 Renewal of a permission on the same or more restrictive terms as the extant permission

Is this project a renewal of a current permission which complies with NRW approved criteria for ruling out significant effects of renewals (see section 6.2A of OGN 200) without conducting a project-specific LSE test?	NO
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3.2 Likelihood of significant effects (LSE) test

3.2.1 Which Natura 2000 sites might be affected by the proposal?	Based on the project specification or information provided in the application, it is considered that the following Natura 2000 sites have features which could be affected by the project: • Severn Estuary / Môr Hafren Special Area of Conservation (SAC) UK0013030 • Severn Estuary / Môr Hafren Special Protection Area (SPA) UK9015022 • Severn Estuary / Môr Hafren Ramsar UK11081 • River Usk / Afon Wysg SAC UK0013007 – located approximately 9.7km to the north-east of the project. • River Wye / Afon Gwy SAC- UK0012642- located approximately 32km to the north-east of the project. The potential for the project to affect the following Natura 2000 sites was also initially considered, but can be ruled out without further consideration: • N/A		
3.2.2 Screening assessment			
Colour coding implemented as follows: <i>There is no impact pathway from the proposal to the designated feature</i> <i>There is an impact pathway in principle, but significant effects from the proposal when considered alone can be ruled out</i> <i>There is an impact pathway and significant effects cannot be ruled out</i>			
	Assessment of likelihood of significant effect		
	I Relevant conservation objectives Documents referred to: The Severn Estuary / Môr Hafren European Marine	II Potential impact pathway	

	Site: Natural England & the Countryside Council for Wales' advice given under Regulation 33(2)(a) of the Conservation (Natural Habitats, &c.) Regulations 1994, as amended.		
Severn Estuary / Môr Hafren SAC			
Designated feature 1 Estuaries	The feature will be considered to be in favourable condition when, subject to natural processes each of the following conditions are met: i. the total extent of the estuary is maintained; ii. the characteristic physical form (tidal prism/cross sectional area) and flow (tidal regime) of the estuary is maintained; iii. the characteristic range and relative proportions of sediment sizes and sediment budget within the site is maintained; iv. the extent, variety and spatial distribution of estuarine habitat communities within the site is maintained; v. the extent, variety,	Appendix 2 Map showing the extent of the "estuaries" feature of the Severn Estuary SAC and Ramsar Site  Key Extent of "estuaries" feature of the SAC Extent of "estuaries" feature of the Ramsar Site This map is indicative only - a definitive map is available from CCW or Natural England on request. Drawn by: Charlotte Pagendam Date: 28/1/2009 Ref: Reg 33 App 2 - Feb 09 © Natural England 2009 Scale 1:500000 0 10 20 30km 0 10 20 25000yd This map is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. All Rights Reserved. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Licence Number 100046223. 2009 i. the total extent of the estuary will be maintained; ii. the characteristic physical form (tidal prism/cross sectional area) and flow (tidal regime) of the estuary will	

	spatial distribution and community composition of hard substrate habitats and their notable communities is maintained; vi. the abundance of the notable estuarine species assemblages is maintained or increased; vii. the physico-chemical characteristics of the water column support the ecological objectives described above; viii. Toxic contaminants in water column and sediment are below levels which would pose a risk to the ecological objectives described above. ix. Airborne nutrient and contaminant loads are below levels which would pose a risk to the ecological objectives described above.	be maintained; iii. the characteristic range and relative proportions of sediment sizes and sediment budget within the site will be maintained; iv. the extent, variety and spatial distribution of estuarine habitat communities within the site will vary; v. the extent, variety, spatial distribution and community composition of hard substrate habitats and their notable communities will be maintained; vi. the abundance of the notable estuarine species assemblages will be maintained or increased; vii. the physico-chemical characteristics of the water column will support the ecological objectives described above; viii. Toxic contaminants in water column and sediment may be affected in the event of a pollution incident which could pose a risk to the ecological objectives described above. ix. Airborne nutrient and contaminant loads will remain below levels which would pose a risk to the ecological objectives described above. Potential pathways for effect from temporary construction access (trampling), potential pollution incident and change in the extent and spatial distribution of estuarine habitat communities (saltmarsh and intertidal mudflat). The extent of the Estuary feature is 73,678ha: the total area enclosed by the polder fencing is 8.7ha (0.011% of feature); of which 5.4ha (0.007% of feature) may change habitat type (from mudflat to saltmarsh). <i>There is an impact pathway and significant effects cannot be ruled out.</i>	
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Designated feature 2

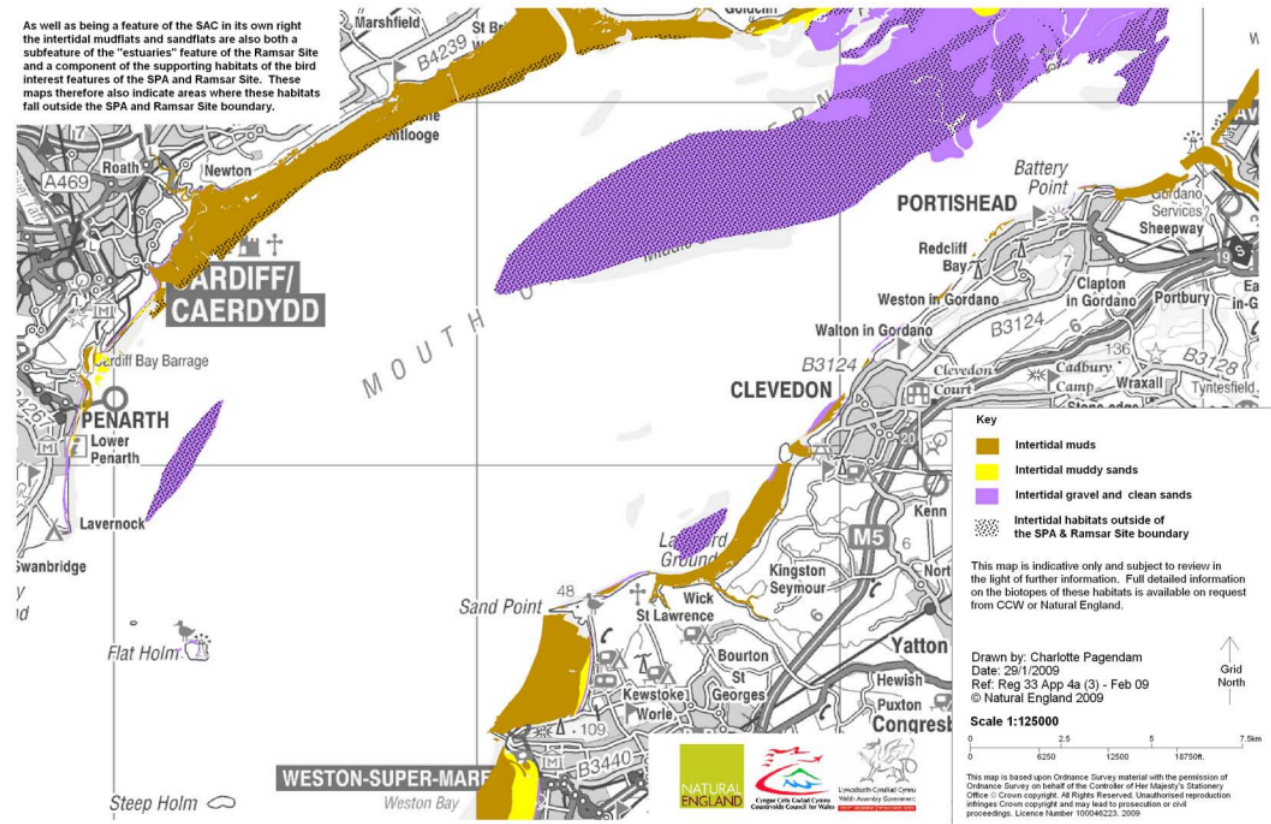
Mudflats and Sandflats not covered by seawater at low tide

The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- The total extent of the mudflats and sandflats feature is maintained;
- the variety and extent of individual mudflats and sandflats communities within the site is maintained;
- the distribution of individual mudflats and sandflats communities within the site is maintained;
- the community composition of the mudflats and sandflats feature within the site is maintained;
- the topography of the intertidal flats and the morphology (dynamic processes of sediment movement and channel migration across the flats) are maintained.

Appendix 4a Maps showing the subfeatures of the "intertidal mudflats & sandflats" feature of the Severn Estuary SAC

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- The elevation of the mudflats and sandflats feature will increase as accretion supports intertidal mudflat development;
- the variety and extent of individual mudflats and sandflats communities within the site will change positively as accretion supports intertidal mudflat development;
- the distribution of individual mudflats and sandflats communities within the site will change;
- the community composition of the mudflats and sandflats feature within the site may be affected in the event of a pollution incident;
- the topography of the intertidal flats and the morphology (dynamic processes of sediment movement and channel migration across the flats) will change positively as accretion supports intertidal mudflat development.

The Intertidal mudflats and sandflats feature in the Severn Estuary covers an area of approximately

		20,300ha. The intertidal muds and intertidal muddy sands sub-features are present within the proposed works area. Within the boundary of the proposed polder repairs and extensions there is currently 5.4ha which is unvegetated and considered to contribute to the intertidal mudflat and sandflat feature. This represents the maximum area that could potentially be restored to saltmarsh habitat. The other sub-features (intertidal gravel and clean sands) are located approximately 6.3km south-east of the proposed works, outside the potential zone of influence. Potential pathways for effect from temporary construction access (trampling), potential pollution incident and change in the extent and spatial distribution of estuarine habitat communities (saltmarsh and intertidal mudflat). Longer term impacts are considered likely from placement of the polders which will contribute to accretion and the intended outcome of saltmarsh habitat. Assessment of coastal squeeze has been undertaken following Guidance Note 062: Natural Resources Wales / Assessing coastal squeeze. The first step is to consider whether there is potential for coastal squeeze to occur: Screening Step 1 – is there potential for coastal squeeze to occur? <i>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 position (this can include works to the landward side of a defence)? Note that maintenance activities are considered at screening step 2</i> Answer - Yes, possibly. The polders are seaward of the more formal flood defence embankment (plus rock armour protection of the upper saltmarsh wharf) and are aimed at enhancing saltmarsh and mudflat habitat. They may also help to protect the existing flood defence infrastructure from erosion, and potentially delay the need for more significant investment in that structure <i>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 as explained in section 1.2 above).</i> Answer - Yes, there is low-lying floodable land behind the embankment/polders. <i>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.</i> Answer - Yes. The Severn Estuary / Môr Hafren SAC, SPA and Ramsar cover the area of the proposed works and include Atlantic salt meadow, intertidal mudflat and sandflat habitats and are a supporting habitat for birds. <i>If the proposed works are in a 'Hold the line' policy unit, does the SMP HRA identify coastal squeeze losses? If the proposed works are in a 'No active intervention' or 'Managed realignment' policy unit then this question does not apply as coastal squeeze will not have been assessed for these policy types. The preferred policy may change over time. Consideration should be given to</i>	
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		<i>the policy periods (SMP epochs) relevant to the proposed lifespan of the works. For works which overlap or cross 2 policy units or more than one epoch you would need to consider the policies for all. Answer - Yes. The proposed polders would mainly be in Policy Unit WEN 1 of the Severn Estuary Shoreline Management Plan (SMP2 Policy Statements – Severn Estuary Coastal Group), but works westwards of the outfall will extend into Policy Unit CAR3. The predicted coastal squeeze losses for these policy units as a whole are given in Table 3 of the Assessment of Coastal Squeeze Guidance Note [Annex B]. The coastal squeeze calculations are based on the ongoing presence and functioning of the flood defence embankment in conjunction with sea-level rise. The proposed polders would not extend to the whole length of either policy unit, and would likely have a limited lifespan (not extending beyond the end of SMP Epoch 2). In addition, consideration would need to be made regarding the role of the polders in contributing to coastal squeeze specifically.</i> <u>Conclusion of Screening Step 1:</u> Coastal squeeze may occur and should be considered further, proceed to Screening Step 2. <i>Screening Step 2 – are the proposed works considered to be maintenance?</i> In the light of Welsh Government's 2021 Clarification Note [Use of the National Habitat Creation Programme in delivering Flood and Coastal Erosion Risk Management projects (gov.wales)], activities considered to fall within the definition of 'maintenance' are not required to be assessed for coastal squeeze at the project level. <u>Conclusion of Screening Step 2:</u> where the works are to the existing polders, this could potentially be considered a maintenance activity. However, the polder field will be extended to the west and would be outside the footprint of any existing structures and would not fall within the definition of maintenance (from Guidance Note 062 'Assessment of Coastal Squeeze'). Therefore, coastal squeeze could occur, and significant effects cannot be ruled out at this stage. <i>There is an impact pathway and significant effects cannot be ruled out.</i>	
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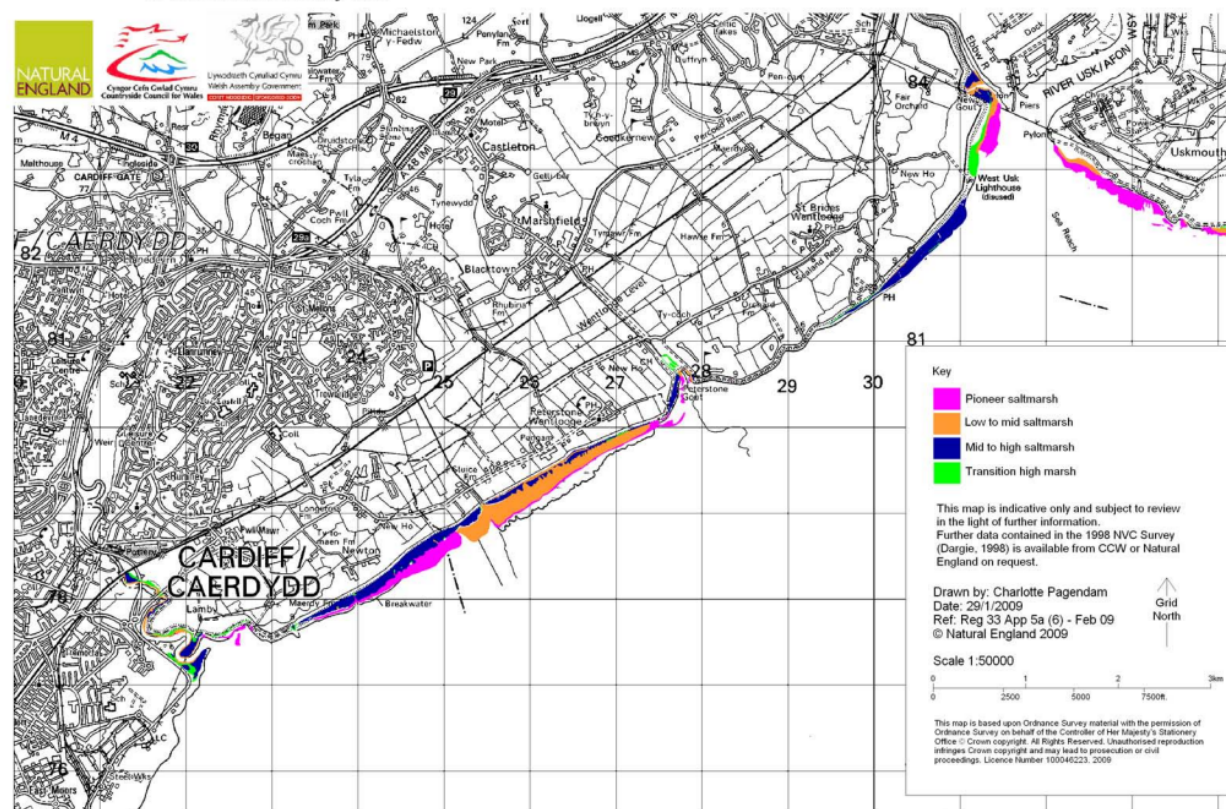
Designated feature 3
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- the total extent of Atlantic salt meadow and associated transitional vegetation communities within the site is maintained;
- the extent and distribution of the individual Atlantic salt meadow and associated transitional vegetation communities within the site is maintained;
- the zonation of Atlantic salt meadow vegetation communities and their associated transitions to other estuary habitats is maintained;
- the relative abundance of the typical species of the Atlantic salt meadow and associated transitional vegetation communities is maintained;
- the abundance of the notable species of the Atlantic salt meadow and

Appendix 5a Maps showing the extent and distribution of the subfeatures of the "Atlantic salt meadows" feature of the Severn Estuary SAC

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- the total extent of Atlantic salt meadow and associated transitional vegetation communities within the site will change positively as accretion supports development of Atlantic salt meadows;
- the extent and distribution of the individual Atlantic salt meadow and associated transitional vegetation communities within the site will change positively as accretion supports development of Atlantic salt meadows;
- the zonation of Atlantic salt meadow vegetation communities and their associated transitions to other estuary habitats will change positively as accretion supports development of Atlantic salt meadows;
- the relative abundance of the typical species of the Atlantic salt meadow and associated transitional vegetation communities will change positively as accretion supports development of Atlantic salt meadows;
- the abundance of the notable species of the Atlantic salt meadow and associated transitional vegetation communities may change positively as accretion supports development of Atlantic salt meadows.
- the structural variation of the saltmarsh sward (resulting from grazing) will be maintained within limits

	associated transitional vegetation communities is maintained. vi. the structural variation of the salt marsh sward (resulting from grazing) is maintained within limits sufficient to satisfy the requirements of conditions iv and v above and the requirements of the Ramsar and SPA features vii. the characteristic stepped morphology of the salt marshes and associated creeks, pills, drainage ditches and pans, and the estuarine processes that enable their development, is maintained. viii Any areas of <i>Spartina anglica</i> salt marsh (SM6) are capable of developing naturally into other saltmarsh communities.	sufficient to satisfy the requirements of conditions iv and v above and the requirements of the Ramsar and SPA features; vii. the characteristic stepped morphology of the salt meadows and associated creeks, pills, drainage ditches and pans, and the estuarine processes that enable their development, will be maintained. viii Any areas of <i>Spartina anglica</i> salt marsh (SM6) will remain capable of developing naturally into other saltmarsh communities. The Atlantic salt meadows feature in the Severn Estuary covers an area of approximately 1,400ha and is present within the proposed works area. The polder fencing will enclose 3.3ha of existing Atlantic salt meadows (0.23% of feature), which will be potentially affected, albeit in a positive way. A further 5.4ha of mudflat may change to saltmarsh (equating to an increase in Atlantic salt meadows feature area of 0.38% across the SAC area). Potential pathways for effect from temporary construction access (trampling), potential pollution incident and change in the extent and spatial distribution of estuarine habitat communities (saltmarsh and intertidal mudflat). Longer term positive effects are considered likely from placement of the polders which will contribute to sediment accretion and the intended outcome of an increase in saltmarsh habitat. The assessment of coastal squeeze undertaken for the intertidal mudflats and sandflats feature above also applies to the Atlantic salt meadows feature. Coastal squeeze could occur, and significant effects cannot be ruled out at this stage. <i>There is an impact pathway and significant effects cannot be ruled out.</i>	
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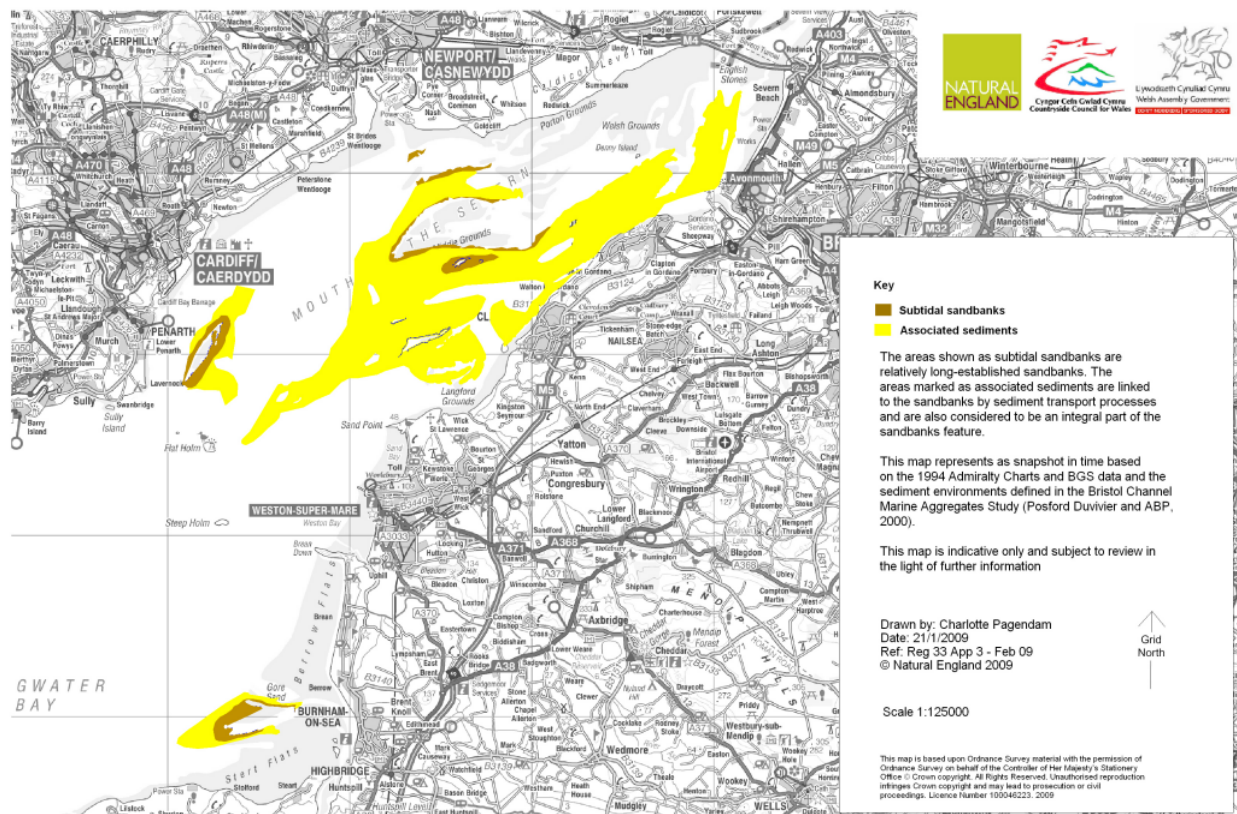
Designated feature 4

Sandbanks which are slightly covered by sea water all the time

The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

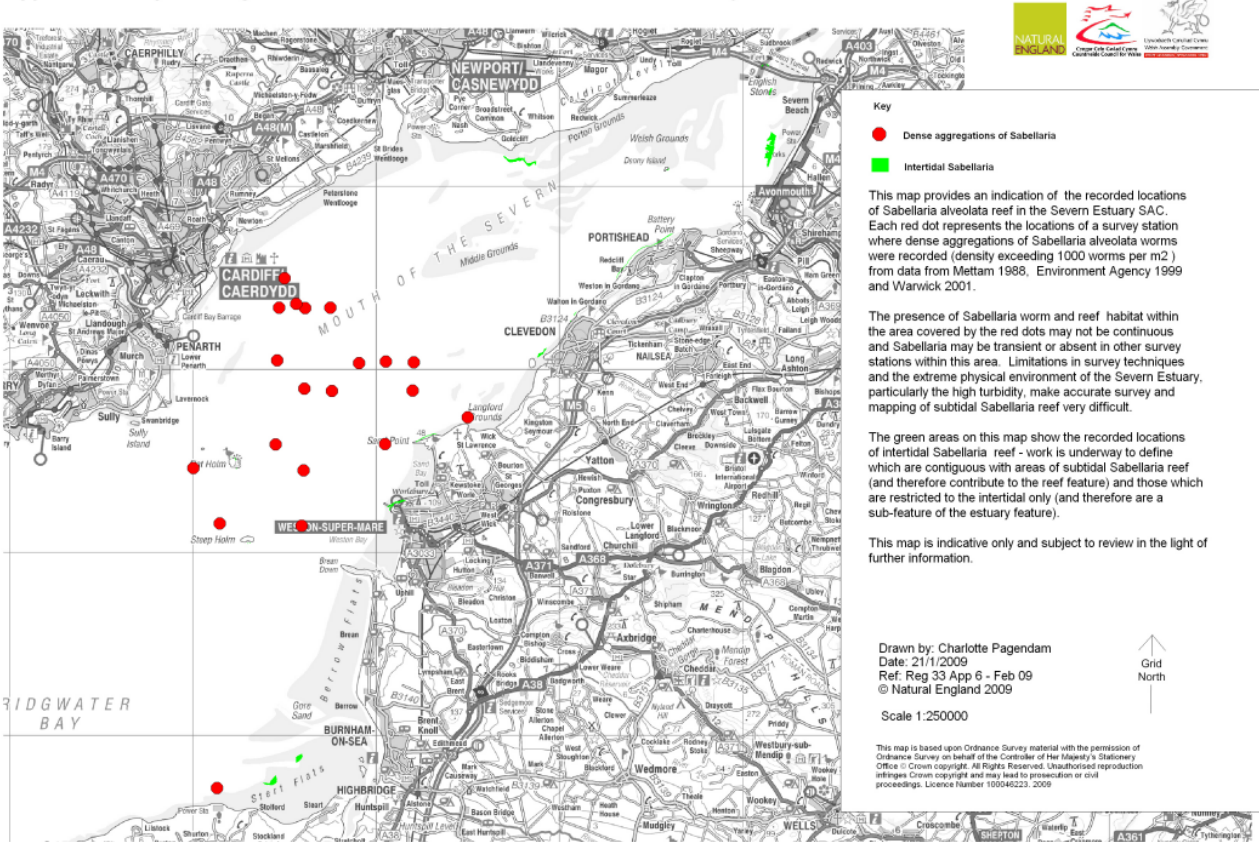
- i. the total extent of the subtidal sandbanks within the site is maintained;
- ii. the extent and distribution of the individual subtidal sandbank communities within the site is maintained;
- iii. the community composition of the subtidal sandbank feature within the site is maintained;
- iv. the variety and distribution of sediment types across the subtidal sandbank feature is maintained;
- v. the gross morphology (depth, distribution and profile) of the subtidal sandbank feature within the site is maintained.

Appendix 3 Map showing the extent of the "subtidal sandbanks" feature of the Severn Estuary SAC



The habitat features are located approximately 7.2km south and 7km south-east of the proposed works, outside the potential zone of influence.

There is no impact pathway from the proposal to the designated feature.

Designated feature 5 Reefs	The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met: i. the total extent and distribution of <i>Sabellaria</i> reef is maintained; ii. the community composition of the <i>Sabellaria</i> reef is maintained; iii. the full range of different age structures of <i>Sabellaria</i> reef are present; iv. the physical and ecological processes necessary to support <i>Sabellaria</i> reef are maintained.	Appendix 6 Map showing the extent of the "reef" feature of the Severn Estuary SAC  The habitat features are located approximately 4km south of the proposed works, outside the potential zone of influence. There is no impact pathway from the proposal to the designated feature.	
Designated feature 6 Sea lamprey (<i>Petromyzon marinus</i>)	The fish features will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met: i. the migratory	i. the migratory passage of both adult and juvenile through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not directly obstructed but potential for impediment by the proposed polders may incur physical barriers – unlikely considering design allows for maintenance of existing channels to ensure efficient drainage at low tides. - ii the size of the population in the Severn Estuary and the rivers which drain into it, may be affected pending potential for polders to create impediment – unlikely considering design allows for maintenance of existing channels to ensure efficient drainage at low tides. iii. the abundance of prey species forming the food resource within the estuary, will be maintained or	

(<i>Lampetra fluviatilis</i>) Designated feature 8 Twaite shad (<i>Alosa fallax</i>)	passage of both adult and juvenile through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows, or poor water quality; ii the size of the population in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term; iii. the abundance of prey species forming the food resource within the estuary, is maintained. iv. Toxic contaminants in the water column and sediment are below levels which would pose a risk to the ecological objectives described above.	increased. iv. Toxic contaminants in the water column and sediment may be affected in the event of a pollution incident which could pose a risk to the ecological objectives described above. Twaite shad and sea lamprey are anadromous, spending most of their life cycle at sea and actively migrating upstream to the major rivers of the Severn Estuary only to spawn; whilst river lamprey spend the majority of the life cycle within the Severn Estuary’s major rivers and occasionally within the river mouths at their confluence with the estuary. Whilst the polders are designed to trap sediment, the design necessitates efficient drainage to allow the settlement of suspended sediments. As such, the design has obligatory drainage centred on existing creeks and channels to ensure efficient movement of water at low tides – this necessary feature will avoid fish becoming trapped within the polder as the tide recedes. Consequently, the polders are not considered a barrier to migration. Fish features of the Severn Estuary can utilise a vast area (73,714Ha); however, in the event of a pollution incident, fish species within the immediate locality could be affected. Direct impacts are unlikely since all works must take place at low tide. There is an impact pathway and significant effects cannot be ruled out.	
Severn Estuary / Môr Hafren SPA			
Internationally important population of regularly occurring Annex 1 species:	Severn Estuary / Môr Hafren SPA conservation objectives require (ii) the extent of saltmarsh and associated strandlines	Bewick’s swan have not been recorded within the BTO WeBS data provided for the Rhymney Estuary and Great Wharf sector, nor the Peterstone Wentlooge sector, which are the WeBS Survey Cell surrounding the restoration area. There is no pathway for effect due to the lack of presence of this species within the restoration area. There is no impact pathway from the proposal to the designated feature.	

Bewick's swan	is maintained; (iii) the extent of intertidal mudflats and sandflats is maintained.		
Internationally important population of regularly occurring migratory species: Wintering European white-fronted goose Wintering Dunlin Wintering Redshank Wintering Shelduck Wintering Gadwall	The extent of vegetation with a sward height of <10cm is maintained throughout the saltmarsh; The abundance and macro-distribution of suitable invertebrates in intertidal mudflats and sandflats is maintained; The abundance and macro-distribution of suitable invertebrates in hard substrate habitats is maintained; Unrestricted bird sightlines of >200m at feeding and roosting sites are maintained; Aggregations of dunlin, redshank gadwall and shelduck at feeding or roosting sites are not subject to significant disturbance.	Wintering European white-fronted goose have not been recorded within the BTO WeBS data provided for the Rhymney Estuary and Great Wharf sector, nor the Peterstone Wentlooge sector, which are the WeBS Survey Cell comprising the restoration area and adjacent habitats. There is no pathway for effect due to the lack of presence of this species within the restoration area. Potential for visual and acoustic disturbance and displacement from human and machinery activity should installation occur within the wintering bird season (October to March inclusive). Disturbance / displacement risks reduced food intake and/or increased energy expenditure that may result in morbidity / mortality, particularly during extreme cold weather events. However, restoration area only occurring over a very minor area (0.026%) of the overall Severn Estuary; as such, alternative areas would always be available. No effect on benthic infaunal macroinvertebrate populations (bird food resource) are anticipated; however, restoration of intertidal mudflat and saltmarsh is likely to result in an overall positive impact on benthic infaunal populations and increased saltmarsh cover will provide additional foraging resource. Bird sightlines may be affected by the polder fencing, reducing available predator observation area. This effect will be over a small area of habitat, approximately an area of 5.4ha (0.026% of the estuary) potentially affected. <i>There is an impact pathway and significant effects cannot be ruled out</i>	
Assemblage of wintering birds (regularly supports over 20,000 waterfowl)	The extent of vegetation of <10cm throughout the saltmarsh is maintained; The abundance and macroscale distribution of suitable	Potential for visual and acoustic disturbance and displacement from human and machinery activity should installation occur within the wintering bird season (October to March inclusive). Disturbance / displacement risks reduced food intake and/or increased energy expenditure that may result in morbidity / mortality, particularly during extreme cold weather events. However, restoration area only occurring over a very minor area (0.026%) of the overall Severn Estuary; as such, alternative areas would always be available. No effect on benthic infaunal macroinvertebrate populations (bird food resource) are anticipated; however,	

	invertebrates in intertidal mudflats and sandflats is maintained; The abundance and macroscale distribution of suitable invertebrates in hard substrate habitats is maintained; Greater than 25% cover of suitable soft leaved herbs and grasses during the winter on saltmarsh areas is maintained; (ix) unrestricted bird sightlines of >500m at feeding and roosting sites are maintained; (x) waterfowl aggregations at feeding or roosting sites are not subject to significant disturbance	restoration of intertidal mudflat and saltmarsh is likely to result in an overall positive impact on benthic infaunal populations and increased saltmarsh cover will provide additional foraging resource. Bird sightlines may be affected by the polder fencing, reducing available predator observation area. This effect will be over a small area of habitat, approximately an area of 5.4ha (0.026% of the estuary) potentially affected. <i>There is an impact pathway and significant effects cannot be ruled out.</i>	
Severn Estuary / Môr Hafren Ramsar			
Habitats: • Sandbanks which are slightly covered by sea water all the time • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Atlantic salt	The conservation objective for the Severn Estuary Ramsar is to maintain the features in a favourable condition.	Potential impacts for the habitat features of the Ramsar are as described for the SAC above. Sandbanks which are slightly covered by sea water all the time – no effect anticipated. Temporary habitat degradation of the Severn Estuary Ramsar through trampling effects (human activity and plant movements) and potential for pollution incidents during construction. <i>There is an impact pathway and significant effects cannot be ruled out.</i>	

meadows .			
Fish species: salmon, sea trout, sea lamprey, river lamprey, allis shad, twaite shad and eel. The Site is also an important feeding and nursery ground for many fish species, particularly allis and twaite shad which feed on shrimps within the estuary.	The conservation objective for the Severn Estuary Ramsar is to maintain the features in a favourable condition.	Potential impacts for the fish features of the Ramsar are as described for the SAC above. Atlantic salmon, sea trout, allis shad, twaite shad and sea lamprey are anadromous, spending most of their life cycle at sea and actively migrating upstream to the major rivers of the Severn Estuary only to spawn. European eel are the exception and are catadromous spending most of their life cycle in the estuary's major rivers and tributaries. Similarly, river lamprey spend the majority of the life cycle within the Severn Estuary's major rivers and occasionally within the river mouths at their confluence with the estuary. Whilst the polders are designed to trap sediment, the design necessitates efficient drainage to allow the settlement of suspended sediments. As such, the design has obligatory drainage centred on existing creeks and channels to ensure efficient movement of water at low tides – this necessary feature will avoid fish becoming trapped within the polder as the tide recedes. Consequently, the polders are not considered a barrier to migration. Fish features of the Severn Estuary can utilise a vast area (73,714Ha); however, in the event of a pollution incident, fish species within the immediate locality could be affected. Direct impacts are unlikely since all works must take place at low tide. <i>There is an impact pathway and significant effects cannot be ruled out.</i>	
Bird species: It is also of particular importance for migratory birds during spring and autumn.	The conservation objective for the Severn Estuary Ramsar is to maintain the features in a favourable condition.	Potential for visual and acoustic disturbance and displacement from human and machinery activity should installation occur within the wintering bird season (October to March inclusive). Disturbance / displacement risks reduced food intake and/or increased energy expenditure that may result in morbidity / mortality, particularly during extreme cold weather events. However, restoration area only occurring over a very minor area (0.026%) of the overall Severn Estuary; as such, alternative areas would always be available. No effect on benthic infaunal macroinvertebrate populations (bird food resource) are anticipated; however, restoration of intertidal mudflat and saltmarsh is likely to result in an overall positive impact on benthic infaunal populations and increased saltmarsh cover will provide additional foraging resource. Bird sightlines may be affected by the polder fencing, reducing available predator observation area. This effect will be over a small area of habitat, approximately an area of 5.4ha (0.026% of the estuary) potentially affected. Passage waders may be affected by disturbance / displacement during the spring / autumn migration periods; comprising: ringed plover, dunlin, whimbrel and redshank. Ramsar criteria were revised in 2005 to include a nationally important population of breeding lesser black-backed gull.	

		There is an impact pathway and significant effects cannot be ruled out.	
River Usk / Afon Wysg SAC (9km north-east)			
Designated feature 1 Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation	The natural range of the plant communities represented within this feature should be stable or increasing in the SAC.	No habitat within this SAC will be directly or indirectly affected by the proposed works, as the SAC is located >9km upstream. There is no impact pathway from the proposal to the designated feature.	
Designated feature 2 Sea lamprey (<i>Petromyzon marinus</i>)	The population of the feature in the SAC is stable or increasing over the long term.	The population of the feature in the SAC is stable or increasing over the long term. The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. There is, and will probably continue to be, a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis.	
Designated feature 3 Brook lamprey (<i>Lampetra planeri</i>)	The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future.	Potential impacts for the fish features of the River Usk SAC are as described for the Severn Estuary SAC above.	
Designated feature 4 River lamprey (<i>Lampetra fluviatilis</i>)		Atlantic salmon, twaite shad, allis shad and sea lamprey are anadromous, spending most of their life cycle at sea and actively migrating upstream to the major rivers (e.g. River Usk) of the Severn Estuary only to spawn.	
Designated feature 5 Twaite shad (<i>Alosa fallax</i>)	There is, and will probably continue to be, a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis.	Whilst the polders are designed to trap sediment, the design necessitates efficient drainage to allow the settlement of suspended sediments. As such, the design has obligatory drainage centred on existing creeks and channels to ensure efficient movement of water at low tides – this necessary feature will avoid fish becoming trapped within the polder as the tide recedes. Consequently, the polders are not considered a barrier to migration.	
Designated feature 6 Atlantic salmon (<i>Salmo salar</i>)		Fish features of the Severn Estuary can utilise a vast area (73,714Ha); however, in the event of a pollution incident, fish species within the immediate locality could be affected. Direct impacts are unlikely since all works must take place at low tide. There is an impact pathway and significant effects cannot be ruled out.	
Designated feature 7 Bullhead (<i>Cottus</i>		Bullhead and brook lamprey are non-migratory and as such will not be affected by the proposed works. River lamprey spend the majority of the life cycle within the Severn Estuary's major rivers (e.g. River Usk)	

<i>gobio</i>)		and occasionally within the river mouths at their confluence with the estuary. Note for the River Usk this is located c.9km distant from the proposed polder installation; hence spatial separation is sufficient to conclude no effect. There is no impact pathway from the proposal to the designated feature.	
Designated feature 8 Otter (<i>Lutra lutra</i>)	The population of otters in the SAC is stable or increasing over the long term and reflects the natural carrying capacity of the habitat within the SAC, as determined by natural levels of prey abundance and associated territorial behaviour.	The population of otters in the SAC is stable or increasing over the long term and reflects the natural carrying capacity of the habitat within the SAC, as determined by natural levels of prey abundance and associated territorial behaviour. Due to spatial separation (c.9km) no pathway for effect is considered for otter associated with the River Usk SAC. There is no impact pathway from the proposal to the designated feature.	
Designated feature 9 Allis shad (<i>Alosa alosa</i>)	As for features 2-7 above.	The population of the feature in the SAC is stable or increasing over the long term. The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. There is, and will probably continue to be, a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis. Refer to screening of Features 2, 5 and 6 above. There is an impact pathway and significant effects cannot be ruled out.	
River Wye / Afon Gwy SAC (32km north-east)			
Designated feature 1 Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation	The natural range of the plant communities represented within this feature should be stable or increasing in the SAC.	No habitat within this SAC will be directly or indirectly affected by the proposed works, as the SAC is located >32km upstream. There is no impact pathway from the proposal to the designated feature.	

Designated feature 2 Transition mires and quaking bogs	The natural range of the plant communities represented within this feature should be stable or increasing in the SAC.	No habitat within this SAC will be directly or indirectly affected by the proposed works, as the SAC is located >32km upstream. There is no impact pathway from the proposal to the designated feature.	
Designated feature 3 White-clawed (or Atlantic stream) crayfish (<i>Austropotamobius pallipes</i>)	The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future.	No <i>A. pallipes</i> habitat within this SAC will be directly or indirectly affected by the proposed works, as the SAC is located >32km upstream. There is no impact pathway from the proposal to the designated feature.	
Designated feature 4 Sea lamprey (<i>Petromyzon marinus</i>)	The population of the feature in the SAC is stable or increasing over the long term.	The population of the feature in the SAC is stable or increasing over the long term. The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. There is, and will probably continue to be, a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis.	
Designated feature 5 Brook lamprey (<i>Lampetra planeri</i>)	The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future.		
Designated feature 6 River lamprey (<i>Lampetra fluviatilis</i>)			
Designated feature 7 Twaite shad (<i>Alosa fallax</i>)			
Designated feature 8 Atlantic salmon (<i>Salmo salar</i>)			
Designated			
		Potential impacts for the fish features of the River Wye SAC are as described for the Severn Estuary SAC above. Atlantic salmon, twaite shad, allis shad and sea lamprey are anadromous, spending most of their life cycle at sea and actively migrating upstream to the major rivers (e.g. River Wye) of the Severn Estuary only to spawn. Whilst the polders are designed to trap sediment, the design necessitates efficient drainage to allow the settlement of suspended sediments. As such, the design has obligatory drainage centred on existing creeks and channels to ensure efficient movement of water at low tides – this necessary feature will avoid fish becoming trapped within the polder as the tide recedes. Consequently, the polders are not considered a barrier to migration. Fish features of the Severn Estuary can utilise a vast area (73,714Ha); however, in the event of a pollution incident, fish species within the immediate locality could be affected. Direct impacts are unlikely since all works must take place at low tide. There is an impact pathway and significant effects cannot be ruled out. Bullhead and brook lamprey are non-migratory and as such will not be affected by the proposed works.	

feature 9 Bullhead (<i>Cottus gobio</i>)		River lamprey spend the majority of the life cycle within the Severn Estuary's major rivers (e.g. River Wye) and occasionally within the river mouths at their confluence with the estuary. Note for the River Wye this is located c.32km distant from the proposed polder installation; hence spatial separation is sufficient to conclude no effect. There is no impact pathway from the proposal to the designated feature.	
Designated feature 10 Otter (<i>Lutra lutra</i>)	The population of otters in the SAC is stable or increasing over the long term and reflects the natural carrying capacity of the habitat within the SAC, as determined by natural levels of prey abundance and associated territorial behaviour.	The population of otters in the SAC is stable or increasing over the long term and reflects the natural carrying capacity of the habitat within the SAC, as determined by natural levels of prey abundance and associated territorial behaviour. Due to spatial separation (c.32km) no pathway for effect is considered for otter associated with the River Wye SAC. There is no impact pathway from the proposal to the designated feature.	
Designated feature 11 Allis shad (<i>Alosa alosa</i>)	As for features 4-9 above.	The population of the feature in the SAC is stable or increasing over the long term. The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. There is, and will probably continue to be, a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis. Refer to screening of Features 4, 7 and 8 above. There is an impact pathway and significant effects cannot be ruled out.	

3.2.3 Screening decision of the project 'alone'

(a) If ALL rows in column II of Table 3.2.2 are GREEN

The project is not likely to have a significant effect on any Natura 2000 site, because there is no impact pathway from the project to any Natura 2000 features, and no further consideration under the Habitats Directive/Regulations is required in order to determine the application.

(b) If there are NO rows coloured RED in column II of Table 3.2.2, and there are ANY rows which are BLUE	The project is not likely to have a significant effect on any Natura 2000 sites when considered alone, but the possibility of significant effects in combination with other plans and projects needs to be considered.
(c) If ANY rows in Column II of Table 3.2.2 are RED	The project is likely to have a significant effect on the Severn Estuary European Marine Site from the project alone and therefore an appropriate assessment is required.

4. Appropriate assessment of the project when considered alone

4.1 Assessment of project as currently defined

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
Severn Estuary / Môr Hafren SAC				
Feature 1 Estuaries	iv. the extent, variety and spatial distribution of estuarine habitat communities within the site will vary; viii. Toxic contaminants in water column and sediment may be affected in the event of a pollution incident which could pose a risk to the ecological objectives described.	The variety of estuarine habitat communities - the variety of estuarine habitat communities of the estuary will not be changed by the proposed restoration. <u>Extent and spatial distribution of estuarine habitat communities</u> - the extent and spatial distribution of estuarine habitat communities is likely to change over the long-term following installation of the polders. The polder restoration area encloses 8.7ha (0.011% of the estuary feature); of which 5.4ha (0.007% of the estuary feature) may experience long-term habitat fluctuation between mudflat and saltmarsh – enhancement of intertidal mudflat feature and / or restoration of historic saltmarsh feature. <u>Pollution Incident</u> – During polder installation the estuary feature may be affected by construction vehicles and activities on the foreshore. Plant access creates a potential pathway for a pollution incident, either through release of toxic contaminants or sediment	<u>Extent and spatial distribution of estuarine habitat communities</u> - The extent of the Estuary feature is 73,678ha: the total area enclosed by the polder fencing is 8.7ha (0.011% of the estuary feature); of which 5.4ha (0.007% of the estuary feature) may experience long-term habitat fluctuation between mudflat and saltmarsh – change in extent and spatial distribution of estuarine communities. The 0.007% of the estuary feature that may experience change in spatial distribution of estuarine communities is considered negligible (<i>de minimis</i>) in the context of the whole estuary feature and not at a scale to affect the integrity of the site. <u>Pollution incident</u> – Should a pollution incident occur, in the absence of standard pollution prevention measures, chemicals, fuels or suspended sediment could migrate into the waterbody. Deterioration in water quality resulting from a pollution incident or sediment release may affect the attainment of the conservation objectives. A pathway for effect remains in the absence of mitigation.	<u>Extent and spatial distribution of estuarine habitat communities</u> – YES <u>Pollution Incident</u> – NO

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
		disturbance via access to install the polders.		
Feature 2 Mudflats and Sandflats not covered by seawater at low tide	i. The total extent of the mudflats and sandflats feature will change positively as accretion supports intertidal mudflat development; ii. the variety and extent of individual mudflats and sandflats communities within the site will change positively as accretion supports intertidal mudflat development; iii. the distribution of individual mudflats and sandflats communities within the site will change; iv. the community composition of the mudflats and sandflats feature within the site may be affected in the event of a pollution incident; v. the topography of the intertidal flats and the morphology (dynamic processes of sediment movement and channel migration	Total extent of intertidal mudflats and sandflats – up to 5.4ha of the intertidal mudflats and sandflats feature may experience long-term habitat fluctuation between mudflat and saltmarsh – enhancement of intertidal mudflat feature and / or restoration of historic saltmarsh feature. <u>Variety, extent, distribution, topography and morphology of individual mudflats</u> – the variety, extent, distribution, topography and morphology of individual intertidal mudflats (over an area of up to 5.4ha) may experience long-term habitat fluctuation between mudflat and saltmarsh – enhancement of intertidal mudflat feature and / or restoration of historic saltmarsh feature. <u>Coastal Squeeze</u> – Similarly, coastal squeeze may potentially affect intertidal mudflats over the long-term. <u>Pollution Incident</u> – During polder installation the intertidal mudflat feature may be affected by construction vehicles and activities on the foreshore. Plant access creates a potential pathway for a pollution incident, either through release of toxic contaminants or sediment disturbance via access to install the polders.	<u>Variety, extent, distribution, topography and morphology of intertidal mudflats and sandflats</u> – the intertidal mudflats and sandflats feature in the Severn Estuary covers an area of approximately 20,300ha. The intertidal muds and intertidal muddy sands sub-features are present within the proposed works area, with an area of 5.4ha (0.026%). Any change in the 0.026% area of intertidal mudflat is considered negligible (<i>de minimis</i>) relative to the feature extent and not at a scale to affect the integrity of the site. Additionally, the condition of the feature will be enhanced through accretion of muddy sediment behind the polders. Furthermore, a long-term flux between mudflat and saltmarsh habitat will perpetuate relative to erosional pressures – as described for <i>Coastal Squeeze</i> below. Historically, Rhymney Great Wharf (Saltings) was a vast coastal band of Atlantic salt meadows (c.375m wide @1888; c.f. c. 65m wide @ 2023); consequently, polder installation supports regeneration of the original estuarine habitat. <u>Coastal Squeeze</u> – According to the SMP2 HRA, coastal squeeze is expected to affect the Atlantic saltmeadow and intertidal mudflat and sandflat features present in the policy units associated with the project area. Coastal squeeze losses in the SMP HRA were based on the interaction between the flood defence structure and rising sea-levels, noting that the area was designated and that accommodation space was available behind the	<u>Variety, extent, distribution, topography and morphology of intertidal mudflats and sandflats</u> – YES <u>Coastal Squeeze</u> – YES

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
	across the flats) will change positively as accretion supports intertidal mudflat development.		defence infrastructure. In the case of the polders project, the works will be carried out seaward of the formal flood defence structure (embankment and rock armour), with the primary aim of habitat restoration and management of SAC features. Habitat restoration may deliver a secondary benefit in terms of helping to protect the flood defence structure from erosion. The polders themselves should not affect the predicted coastal squeeze associated with the flood defence structure, in that coastal squeeze would continue to occur whether or not the polders project was implemented, given that it is reasonable to expect the flood embankment to remain in place and functioning for the lifetime of the polders project. The project will potentially change the balance between saltmarsh and mudflat habitat within the polders whilst hydrodynamic conditions allow. As sea-level rises, we would expect hydrodynamic energy to increase and that a) the polders may become more difficult to maintain and b) we may see saltmarsh that has established potentially reverting to mudflat again. The polders themselves will not limit or restrict the width of the intertidal zone or prevent habitat roll-back, that constraint remains with the flood defence embankment / rock armour which do not form part of the proposed works associated with this project. Coastal squeeze screening would need to be undertaken separately for any future proposed works to the formal defence structure which are not associated with this project. <u>Conclusion</u>: no coastal squeeze is predicted as a result of the	

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
			proposed works alone. <u>Pollution Incident</u> – Should a pollution incident occur, in the absence of standard pollution prevention measures, chemicals, fuels or suspended sediment could migrate into the waterbody. Deterioration in water quality resulting from a pollution incident or sediment release may affect the attainment of the conservation objectives. A pathway for effect remains in the absence of mitigation.	<u>Pollution Incident</u> – NO
Feature 3 Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)	i. the total extent of Atlantic salt meadow and associated transitional vegetation communities within the site will change positively as accretion supports development of Atlantic salt meadows; ii. the extent and distribution of the individual Atlantic salt meadow and associated transitional vegetation communities within the site will change positively as accretion supports development of Atlantic salt meadows; iii. the zonation of Atlantic salt meadow	Maintain total extent of Atlantic salt meadow – the existing 3.3Ha of Atlantic salt meadow will be maintained, and the proposed polder area may restore up to 5.4ha of additional Atlantic salt meadow, supporting restoration of the historic saltmarsh extent. <u>Variety, extent and distribution of individual Atlantic salt meadows:</u> <u>Polder Operation</u> – the variety, extent, distribution, topography and morphology of individual Atlantic salt meadows (over an area of up to 5.4ha) may experience long-term habitat fluctuation between mudflat and saltmarsh – enhancement of intertidal mudflat feature and / or restoration of historic saltmarsh feature. <u>Coastal Squeeze</u> – Similarly, coastal squeeze may potentially affect Atlantic salt meadows over the long-term.	<u>Variety, extent and distribution of Atlantic salt meadows:</u> <u>Polder Operation</u> – the Atlantic salt meadow feature in the Severn Estuary covers an area of approximately 1,400ha and is present within the proposed works area. The polder fencing will enclose approximately 3.3Ha of existing Atlantic salt meadow (0.23% of feature), which will support restoration and expand the extent, technically deviating from the ‘maintain saltmarsh extent’ objective. Polder installation could ultimately restore up to 5.4ha of Atlantic salt meadow; equating to a maximum increase of 0.38% of Atlantic salt meadow extent across the estuary). Ultimately, success would lead to a positive outcome. <u>Coastal Squeeze</u> – as considered for the intertidal mudflats and sandflats feature above - Conclusion: no coastal squeeze is predicted as a result of the proposed works alone. <u>Zonation and relative abundance of typical and</u>	<u>Variety, extent and distribution of Atlantic salt meadows:</u> <u>Polder Operation</u> – YES <u>Coastal Squeeze</u> – YES <u>Zonation and</u>

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
	vegetation communities and their associated transitions to other estuary habitats will change positively as accretion supports development of Atlantic salt meadows; iv. the relative abundance of the typical species of the Atlantic salt meadow and associated transitional vegetation communities will change positively as accretion supports development of Atlantic salt meadows; v. the abundance of the notable species of the Atlantic salt meadow and associated transitional vegetation communities may change positively as accretion supports development of Atlantic salt meadows.	<u>Zonation and relative abundance of typical and notable species of Atlantic salt meadows:</u> <u>Polder Installation</u> – temporary trampling may affect the condition and relative abundance of typical and notable species of Atlantic salt meadow during polder installation if reasonable precautions are not undertaken. Subsequent effects may occur through any ongoing maintenance activities. <u>INNS</u> – relative abundance of typical and notable species of Atlantic salt meadows could potentially be affected by the introduction of Invasive Non-Native Species (INNS). <u>Pollution Incident</u> – During polder installation the Atlantic salt meadow feature may be affected by construction vehicles and activities on the foreshore. Plant access creates a potential pathway for a pollution incident, either through release of toxic contaminants or sediment disturbance via access to install the polders. <u>Polder Operation</u> – operation of the polders will not affect the zonation pattern of Atlantic salt meadow and conversely should create a positive change through seaward expansion as restoration occurs. As such, the relative abundance of typical and notable	<u>notable species of Atlantic salt meadows:</u> <u>Polder Installation</u> – temporary trampling may affect the condition and relative abundance of typical and notable species of Atlantic salt meadow during polder installation if reasonable precautions are not undertaken. Subsequent effects may occur through any ongoing maintenance activities. A pathway for effect remains in the absence of mitigation. <u>INNS</u> – relative abundance of typical and notable species of Atlantic salt meadows could potentially be affected by the introduction of INNS. A pathway for effect remains in the absence of mitigation. <u>Pollution Incident</u> – Should a pollution incident occur, in the absence of standard pollution prevention measures, chemicals, fuels or suspended sediment could migrate into the waterbody. Deterioration in water quality resulting from a pollution incident or sediment release may affect the attainment of the conservation objectives. A pathway for effect remains in the absence of mitigation. <u>Polder Operation</u> – saltmarsh restoration will have a positive effect on the feature. As such, the relative abundance of typical and notable species should only increase as accretion is facilitated behind the polders – no deterioration would be expected.	<u>relative abundance of typical and notable species of Atlantic salt meadows:</u> <u>Polder Installation</u> – NO <u>INNS</u> – NO <u>Pollution Incident</u> – NO <u>Polder Operation</u> – YES

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
		species should only increase as accretion is facilitated behind the polders – no deterioration would be expected.		
Feature 4 Sea lamprey (<i>Petromyzon marinus</i>)	i. the migratory passage of both adult and juvenile through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not directly obstructed but potential for impediment by the proposed polders may incur physical barriers – unlikely considering design allows for maintenance of existing channels to ensure efficient drainage at low tides. ii the size of the population in the Severn Estuary and the rivers which drain into it, may be affected pending potential for polders to create impediment – unlikely considering design allows for maintenance of existing channels to ensure efficient drainage at low tides.	<u>Migratory Obstruction and Population Size</u> - Twaite shad and sea lamprey are anadromous, spending most of their life cycle at sea and actively migrating upstream to the major rivers of the Severn Estuary only to spawn; whilst river lamprey spend the majority of the life cycle within the Severn Estuary's major rivers and occasionally within the river mouths at their confluence with the estuary. As such, neither species spends a large period of time within the Severn Estuary.	<u>Migratory Obstruction and Population Size</u> – since presence of fish features in the locality of the polders is negligible and the polder design must allow for drainage (and therefore route of egress for any fish behind the polders), it is not considered likely that fish features would be impacted, nor would any impact lead to an adverse effect on site integrity.	<u>Migratory Obstruction and Population Size</u> – YES
Feature 5 River lamprey (<i>Lampetra fluviatilis</i>)				<u>Pollution Incident</u> – NO
Feature 6 Twaite shad (<i>Alosa fallax</i>)		Whilst the polders are designed to trap sediment, the design necessitates efficient drainage to allow the settlement of suspended sediments. As such, the design has obligatory drainage centred on existing creeks and channels to ensure efficient movement of water at low tides – this necessary feature will avoid fish becoming trapped within the polder as the tide recedes. Consequently, the polders are not considered a barrier to migration. <u>Pollution Incident</u> – During polder installation fish features may be affected by construction vehicles in the event of a pollution incident. Plant access creates	<u>Pollution Incident</u> – Should a pollution incident occur, in the absence of standard pollution prevention measures, chemicals, fuels or suspended sediment could migrate into the waterbody. Deterioration in water quality resulting from a pollution incident or sediment release may affect the attainment of the conservation objectives. A pathway for effect remains in the absence of mitigation.	

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
	iv. Toxic contaminants in the water column and sediment may be affected in the event of a pollution incident which could pose a risk to the ecological objectives described.	a potential pathway for a pollution incident, through release of toxic contaminants via access to install the polders.		
Severn Estuary / Môr Hafren SPA				
Feature 7 Internationally important population of regularly occurring migratory species: Wintering European white-fronted goose Wintering Dunlin Wintering Redshank Wintering Shelduck Wintering Gadwall	The extent of vegetation with a sward height of <10cm is maintained throughout the saltmarsh; The abundance and macro-distribution of suitable invertebrates in intertidal mudflats and sandflats is maintained; Unrestricted bird sightlines of >200m at feeding and roosting sites are maintained; Aggregations of dunlin, redshank gadwall and shelduck at feeding or roosting sites are not subject to significant disturbance.	<u>Sward Height</u> – sward height will not be affected by the proposed restoration, which relates to ongoing management. <u>Benthic Invertebrates</u> – The abundance and macro-distribution of suitable invertebrates in intertidal mudflats and sandflats will be maintained. No effect on benthic infaunal macroinvertebrate populations (bird food resource) are anticipated; however, restoration of intertidal mudflat and saltmarsh is likely to result in an overall positive impact on benthic infaunal populations and increased saltmarsh cover will provide additional foraging resource. <u>Sightlines</u> – Bird sightlines may be affected by the polder fencing, reducing available predator observation area. This effect will be over a small area of habitat, approximately an area of 5.4ha (0.026% of the estuary) potentially affected; as such, alternative foraging /	<u>Sward Height</u> – no effect on conservation objective. <u>Benthic Invertebrates</u> – positive effect on conservation objective. <u>Sightlines</u> – negligible (<i>de minimus</i>) effect predicted. Large expanse of foraging / roosting habitat remains available on seaward side of polders and / or throughout the remainder of the estuary. <u>Disturbance (Acoustic and Visual)</u> : <i>Wintering European white-fronted goose</i> – feature not present in restoration area. <i>Wintering Dunlin, Redshank, Shelduck, Gadwall</i> – potential for acoustic and / or visual disturbance for activities during overwintering period - October to March inclusive.	<u>Sward Height</u> – YES <u>Benthic Invertebrates</u> – YES <u>Sightlines</u> – YES <u>Disturbance (Acoustic and Visual)</u> : <i>Wintering European white-fronted goose</i> – YES <i>Wintering Dunlin, Redshank, Shelduck, Gadwall</i> – NO

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
		roosting areas would always be available. <u>Disturbance (Acoustic and Visual):</u> <i>Wintering European white-fronted goose</i> – European white-fronted goose have not been recorded within the BTO WeBS data provided for the Rhymney Estuary and Great Wharf sector, nor the Peterstone Wentlooge sector, which are the WeBS Survey Cell comprising the restoration area and adjacent habitats. There is no pathway for effect due to the lack of presence of this species within the restoration area. <i>Wintering Dunlin, Redshank, Shelduck, Gadwall</i> – Potential for visual and acoustic disturbance and displacement from human and machinery activity should installation occur within the wintering bird season (October to March inclusive). Disturbance / displacement risks reduced food intake and/or increased energy expenditure that may result in morbidity / mortality, particularly during extreme cold weather events. However, restoration area only occurring over a very minor area (0.026%) of the overall Severn Estuary; as such, alternative areas would always be available.		
Feature 8 Assemblage of	The extent of vegetation of <10cm	<u>Sward Height</u> – sward height will not be affected by the proposed restoration,	<u>Sward Height</u> – no effect on conservation objective.	<u>Sward Height</u> – YES

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
wintering birds (regularly supports over 20,000 waterfowl)	throughout the saltmarsh is maintained; The abundance and macroscale distribution of suitable invertebrates in intertidal mudflats and sandflats is maintained; Greater than 25% cover of suitable soft leaved herbs and grasses during the winter on saltmarsh areas is maintained; (ix) unrestricted bird sightlines of >500m at feeding and roosting sites are maintained; (x) waterfowl aggregations at feeding or roosting sites are not subject to significant disturbance	which relates to ongoing management. <u>Benthic Invertebrates</u> – The abundance and macro-distribution of suitable invertebrates in intertidal mudflats and sandflats will be maintained. No effect on benthic infaunal macroinvertebrate populations (bird food resource) are anticipated; however, restoration of intertidal mudflat and saltmarsh is likely to result in an overall positive impact on benthic infaunal populations and increased saltmarsh cover will provide additional foraging resource. <u>Cover of suitable soft-leaved herbs and grasses</u> – restoration of the Atlantic salt meadows will increase the available vegetative forage for overwintering birds. <u>Sightlines</u> – Bird sightlines may be affected by the polder fencing, reducing available predator observation area. This effect will be over a small area of habitat, approximately an area of 5.4ha (0.026% of the estuary) potentially affected; as such, alternative foraging / roosting areas would always be available. <u>Disturbance (Acoustic and Visual) - Wintering Waterbird Aggregations</u> – Potential for visual and acoustic disturbance and displacement from	<u>Benthic Invertebrates</u> – positive effect on conservation objective. <u>Cover of suitable soft-leaved herbs and grasses</u> – restoration of the Atlantic salt meadows will increase the available vegetative forage for overwintering birds. <u>Sightlines</u> – negligible (<i>de minimus</i>) effect predicted. Large expanse of foraging / roosting habitat remains available on seaward side of polders and / or throughout the remainder of the estuary. <u>Disturbance (Acoustic and Visual) - Wintering Waterbird Aggregations</u> – potential for acoustic and / or visual disturbance for activities during overwintering period - October to March inclusive.	<u>Benthic Invertebrates</u> – YES <u>Vegetative Forage</u> – YES <u>Sightlines</u> – YES <u>Disturbance (Acoustic and Visual) - Wintering Waterbird Aggregations</u> – NO

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
		human and machinery activity should installation occur within the wintering bird season (October to March inclusive). Disturbance / displacement risks reduced food intake and/or increased energy expenditure that may result in morbidity / mortality, particularly during extreme cold weather events. However, restoration area only occurring over a very minor area (0.026%) of the overall Severn Estuary; as such, alternative areas would always be available.		
Severn Estuary / Môr Hafren Ramsar				
Feature 9 Habitats: - Sandbanks which are slightly covered by sea water all the time - Estuaries - Mudflats and sandflats not covered by seawater at low tide - Atlantic salt meadows	Temporary habitat degradation of the Severn Estuary Ramsar through trampling effects (human activity and plant movements) and potential for pollution incidents during construction.	<i>Sandbanks which are slightly covered by sea water all the time</i> – no effect. <i>Estuaries</i> – as per SAC feature - potential for pollution incident. Mudflats and sandflats not covered by seawater at low tide – as per SAC feature - potential for pollution incident. Atlantic salt meadows – as per SAC feature: temporary deterioration of habitat condition: via vehicle access, potential INNS introduction, potential for pollution incident.	<u>Temporary Deterioration of Habitat Condition:</u> <u>Polder Installation</u> – temporary trampling may affect the condition and relative abundance of typical and notable species of Atlantic salt meadow during polder installation if reasonable precautions are not undertaken. Subsequent effects may occur through any ongoing maintenance activities. A pathway for effect remains in the absence of mitigation. <u>INNS</u> – relative abundance of typical and notable species of Atlantic salt meadows could potentially be affected by the introduction of INNS. A pathway for effect remains in the absence of mitigation. <u>Pollution Incident</u> – Should a pollution incident occur, in the absence of standard pollution prevention measures, chemicals, fuels or	<u>Temporary Deterioration of Habitat Condition:</u> <i>Polder Installation</i> – NO <i>INNS</i> - NO <i>Pollution Incident</i> – NO

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
			suspended sediment could migrate into the waterbody. Deterioration in water quality resulting from a pollution incident or sediment release may affect the attainment of the conservation objectives. A pathway for effect remains in the absence of mitigation.	
Feature 10 Fish species: salmon, sea trout, sea lamprey, river lamprey, allis shad, twaite shad and eel.	Potential pathways for effects on the fish features of the Ramsar are as described for the SAC above.	<u>Migratory Obstruction and Population Size</u> - Atlantic salmon, sea trout, allis shad, twaite shad and sea lamprey are anadromous, spending most of their life cycle at sea and actively migrating upstream to the major rivers of the Severn Estuary only to spawn; whilst river lamprey spend the majority of the life cycle within the Severn Estuary's major rivers and occasionally within the river mouths at their confluence with the estuary. European eel; however, are catadromous spending most of their life cycle in the estuary's major rivers and tributaries. As such, neither species spends a large period of time within the Severn Estuary. Whilst the polders are designed to trap sediment, the design necessitates efficient drainage to allow the settlement of suspended sediments. As such, the design has obligatory drainage centred on existing creeks and channels to ensure efficient movement of water at low tides – this necessary feature will avoid fish becoming trapped within the polder as the tide recedes. Consequently, the polders are not	<u>Migratory Obstruction and Population Size</u> – since presence of fish features in the locality of the polders is negligible and the polder design must allow for drainage (and therefore route of egress for any fish behind the polders), it is not considered likely that fish features would be impacted, nor would any impact lead to an adverse effect on site integrity. <u>Pollution Incident</u> – Should a pollution incident occur, in the absence of standard pollution prevention measures, chemicals, fuels or suspended sediment could migrate into the waterbody. Deterioration in water quality resulting from a pollution incident or sediment release may affect the attainment of the conservation objectives. A pathway for effect remains in the absence of mitigation.	<u>Migratory Obstruction and Population Size</u> – YES <u>Pollution Incident</u> – NO

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
		considered a barrier to migration. <u>Pollution Incident</u> – During polder installation fish features may be affected by construction vehicles in the event of a pollution incident. Plant access creates a potential pathway for a pollution incident, through release of toxic contaminants via access to install the polders.		
Feature 11 Bird species: It is also of particular importance for migratory birds during spring and autumn.	The extent of vegetation of <10cm throughout the saltmarsh is maintained; The abundance and macroscale distribution of suitable invertebrates in intertidal mudflats and sandflats is maintained; (ix) unrestricted bird sightlines of >500m at feeding and roosting sites are maintained; (x) waterfowl aggregations at feeding or roosting sites are not subject to significant disturbance	<u>Sward Height</u> – sward height will not be affected by the proposed restoration, which relates to ongoing management. <u>Benthic Invertebrates</u> – The abundance and macro-distribution of suitable invertebrates in intertidal mudflats and sandflats will be maintained. No effect on benthic infaunal macroinvertebrate populations (bird food resource) are anticipated; however, restoration of intertidal mudflat and saltmarsh is likely to result in an overall positive impact on benthic infaunal populations and increased saltmarsh cover will provide additional foraging resource. <u>Sightlines</u> – Bird sightlines may be affected by the polder fencing, reducing available predator observation area. This effect will be over a small area of habitat, approximately an area of 5.4ha (0.026% of the estuary) potentially affected; as such, alternative foraging /	<u>Sward Height</u> – no effect on conservation objective. <u>Benthic Invertebrates</u> – positive effect on conservation objective. <u>Sightlines</u> – negligible (<i>de minimus</i>) effect predicted. Large expanse of foraging / roosting habitat remains available on seaward side of polders and / or throughout the remainder of the estuary. <u>Disturbance (Acoustic and Visual) – Passage Waders</u> – potential for acoustic and / or visual disturbance for activities during spring / autumn migration periods, or lesser black-backed gull breeding season.	<u>Sward Height</u> – YES <u>Benthic Invertebrates</u> – YES <u>Sightlines</u> – YES <u>Disturbance (Acoustic and Visual) – Passage Waders</u> – NO

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
		roosting areas would always be available. <u>Disturbance (Acoustic and Visual)</u> – Passage waders may be affected by disturbance / displacement during the spring / autumn migration periods; comprising: ringed plover, dunlin, whimbrel and redshank. Ramsar criteria were revised in 2005 to include a nationally important population of breeding lesser black-backed gull.		
River Usk / Afon Wysg SAC (9km north-east)				
Feature 2 Sea lamprey (<i>Petromyzon marinus</i>) Feature 5 Twaite shad (<i>Alosa fallax</i>) Feature 6 Atlantic salmon (<i>Salmo salar</i>) Feature 9 Allis shad (<i>Alosa alosa</i>)	The population of the feature in the SAC is stable or increasing over the long term.	<u>Migratory Obstruction and Population Size</u> - Twaite shad and sea lamprey are anadromous, spending most of their life cycle at sea and actively migrating upstream to the major rivers of the Severn Estuary only to spawn; whilst river lamprey spend the majority of the life cycle within the Severn Estuary's major rivers and occasionally within the river mouths at their confluence with the estuary. As such, neither species spends a large period of time within the Severn Estuary. Whilst the polders are designed to trap sediment, the design necessitates efficient drainage to allow the settlement of suspended sediments. As such, the design has obligatory drainage centred on existing creeks and channels to ensure efficient movement of water at	<u>Migratory Obstruction and Population Size</u> – since presence of fish features in the locality of the polders is negligible and the polder design must allow for drainage (and therefore route of egress for any fish behind the polders), it is not considered likely that fish features would be impacted, nor would any impact lead to an adverse effect on site integrity. <u>Pollution Incident</u> – Should a pollution incident occur, in the absence of standard pollution prevention measures, chemicals, fuels or suspended sediment could migrate into the waterbody. Deterioration in water quality resulting from a pollution incident or sediment release may affect the attainment of the conservation objectives. A pathway for effect remains in the absence of mitigation.	<u>Migratory Obstruction and Population Size</u> – YES <u>Pollution Incident</u> – NO

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
		low tides – this necessary feature will avoid fish becoming trapped within the polder as the tide recedes. Consequently, the polders are not considered a barrier to migration. <u>Pollution Incident</u> – During polder installation fish features may be affected by construction vehicles in the event of a pollution incident. Plant access creates a potential pathway for a pollution incident, through release of toxic contaminants via access to install the polders.		
River Wye / Afon Gwy SAC (32km north-east)				
Feature 4 Sea lamprey (<i>Petromyzon marinus</i>) Feature 7 Twaite shad (<i>Alosa fallax</i>) Feature 8 Atlantic salmon (<i>Salmo salar</i>) Feature 11 Allis shad (<i>Alosa alosa</i>)	The population of the feature in the SAC is stable or increasing over the long term.	<u>Migratory Obstruction and Population Size</u> - Twaite shad and sea lamprey are anadromous, spending most of their life cycle at sea and actively migrating upstream to the major rivers of the Severn Estuary only to spawn; whilst river lamprey spend the majority of the life cycle within the Severn Estuary's major rivers and occasionally within the river mouths at their confluence with the estuary. As such, neither species spends a large period of time within the Severn Estuary. Whilst the polders are designed to trap sediment, the design necessitates efficient drainage to allow the settlement of suspended sediments. As such, the	<u>Migratory Obstruction and Population Size</u> – since presence of fish features in the locality of the polders is negligible and the polder design must allow for drainage (and therefore route of egress for any fish behind the polders), it is not considered likely that fish features would be impacted, nor would any impact lead to an adverse effect on site integrity. <u>Pollution Incident</u> – Should a pollution incident occur, in the absence of standard pollution prevention measures, chemicals, fuels or suspended sediment could migrate into the waterbody. Deterioration in water quality resulting from a pollution incident or sediment release may affect the attainment of the conservation objectives. A pathway for effect remains in the absence of mitigation.	<u>Migratory Obstruction and Population Size</u> – YES <u>Pollution Incident</u> – NO

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
		design has obligatory drainage centred on existing creeks and channels to ensure efficient movement of water at low tides – this necessary feature will avoid fish becoming trapped within the polder as the tide recedes. Consequently, the polders are not considered a barrier to migration. <u>Pollution Incident</u> – During polder installation fish features may be affected by construction vehicles in the event of a pollution incident. Plant access creates a potential pathway for a pollution incident, through release of toxic contaminants via access to install the polders.		

4.2 Assessment of the project taking into account mitigating measures, conditions or restrictions

Natura 2000 Feature (from Table 4.1 – 'NO' rows only)	Description of adverse effect(s)	Can adverse effect(s) be mitigated?	Description of mitigation measures, and how they would be applied (e.g. contractual obligations, consent conditions)	Can adverse effect on site integrity be ruled out? *
[Severn Estuary / Môr Hafren SAC] Feature 1 - Estuaries	<u>Pollution Incident</u> – During polder installation fish features may be affected by	YES	Standard best practice construction techniques will be secured through the project Environmental Action Plan (EAP). The EAP includes site-specific methods to ensure that all site activities are controlled and are in accordance with standard operating procedures; e.g. relevant	YES

[Severn Estuary / Môr Hafren SAC] Feature 2 - Mudflats and Sandflats not covered by seawater at low tide	construction vehicles in the event of a pollution incident. Plant access creates a potential pathway for a pollution incident, through release of toxic contaminants via access to install the polders.		Guidelines for Pollution Prevention (GPP's) and CIRIA best practice. Specific guidance includes GPP5: Works and Maintenance in or Near Water, CIRIA C741 'Environmental Good Practice on Site'; Fourth Edition (2015). As per Section 4.0 of the Outline Construction Method Statement (Appendix C of the Marine Licence application), all machines will operate on both biodegradable hydraulic oils and Hydrogenated Vegetable Oil (HVO) fuel to avoid toxic contaminants entering the waterbody in the unlikely event of a pollution incident. Pollution Prevention measures are secured via the Environmental Action Plan (EAP – Appendix G of the Marine Licence application) as follows: - Any fuel / plant storage or refuelling to undertaken in accordance with relevant GPPs. - The Contractor will develop and implement a Construction Environmental Management Plan for the works, which will include best practice pollution prevention measures when working in the channel (GPP5 to be followed at a minimum) – e.g, reducing plant movements. - Site-specific methods will ensure that all site activities are controlled and are in accordance with standard operating procedures, e.g., GPP, PPG and CIRIA best practice. - The physical works footprint and the dimensions of the access corridor should be limited as far as reasonably practicable. - All plant will be sourced from a trusted reputable company and will come with spill kits which site personnel will be trained to use. - Vehicles will be loaded with all plant and materials necessary to undertake the works to minimise plant movements below MHWS. - Minimal quantities of fuels, materials, etc. will be taken on to the foreshore with biodegradable fuel oils implemented where practicable. - All storage containers will remain within the site compound and be appropriately bunded to prevent any spillages or leaks. - No storage of materials or refuelling operations will be permitted outside the site compound.	
[Severn Estuary / Môr Hafren SAC] Feature 3 - Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>)				
[Severn Estuary / Môr Hafren SAC] Feature 4 - Sea lamprey (<i>Petromyzon marinus</i>)				
[Severn Estuary / Môr Hafren SAC] Feature 5 - River lamprey (<i>Lampetra fluviatilis</i>)				
[Severn Estuary / Môr Hafren SAC] Feature 6 - Twaite shad (<i>Alosa fallax</i>)				
[Severn Estuary / Môr Hafren Ramsar] Feature 9 - Estuaries				

[Severn Estuary / Môr Hafren Ramsar] Feature 9 - Mudflats and Sandflats not covered by seawater at low tide				
[Severn Estuary / Môr Hafren Ramsar] Feature 9 - Atlantic salt meadows				
[Severn Estuary / Môr Hafren Ramsar] Feature 10 - Fish species: salmon, sea trout, sea lamprey, river lamprey, allis shad, twaite shad and eel.				
[River Usk / Afon Wysg SAC] Feature 2 Sea lamprey (<i>Petromyzon marinus</i>)				
[River Usk / Afon Wysg SAC] Feature 5 Twaite shad (<i>Alosa fallax</i>)				
[River Usk / Afon Wysg SAC] Feature 6 Atlantic salmon (<i>Salmo salar</i>)				

[River Usk / Afon Wysg SAC] Feature 9 Allis shad (<i>Alosa alosa</i>)				
[River Wye/ Afon Gwy SAC] Feature 4 Sea lamprey (<i>Petromyzon marinus</i>)				
[River Wye/ Afon Gwy SAC] Feature 7 Twaite shad (<i>Alosa fallax</i>)				
[River Wye/ Afon Gwy SAC] Feature 8 Atlantic salmon (<i>Salmo salar</i>)				
[River Wye/ Afon Gwy SAC] Feature 11 Allis shad (<i>Alosa alosa</i>)				
[Severn Estuary / Môr Hafren SAC] Feature 3 - Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>)	<u>Zonation and relative abundance of typical and notable species of Atlantic salt meadows / Temporary Deterioration of Habitat Condition:</u>	YES	<u>Zonation and relative abundance of typical and notable species of Atlantic salt meadows / Temporary Deterioration of Habitat Condition:</u> <i>Polder Installation</i> – As per Section 4.0 of the Outline Construction Method Statement (Appendix C of the Marine Licence application) all machines will be low ground pressure to reduce potential trampling effects on intertidal habitats. Bog mats and / or aluminium trackway will also be implemented where necessary to further reduce pressures on underlying habitat. The frequency and extent of plant	YES

[Severn Estuary / Môr Hafren Ramsar] Feature 9 - Estuaries; Mudflats and Sandflats not covered by seawater at low tide; Atlantic salt meadows	<i>Polder Installation</i> – temporary trampling may affect the condition and relative abundance of typical and notable species of Atlantic salt meadow during polder installation if reasonable precautions are not undertaken. Subsequent effects may occur through any ongoing maintenance activities. <i>INNS</i> – relative abundance of typical and notable species of Atlantic salt meadows could potentially be affected by the introduction of Invasive Non-Native Species (INNS).		access will be minimised as far as practicable through agreement with the NRW Rhymney Great Wharf Polders Restoration Project Director. <i>INNS</i> – Biosecurity measures are secured via the Biosecurity Plan (Appendix I of the Marine Licence application), Environmental Action Plan (EAP – Appendix G of the Marine Licence application) and also outlined within the Outline Construction Method Statement (Appendix C of the Marine Licence application). Pre-installation INNS checks are recommended. There is potential for INNS to be present along access routes and in intertidal habitats, therefore a precautionary approach shall be adopted. The Contractor shall consider biosecurity in all RAMS. The transfer of amphibian and fish diseases as well as INNS shall be minimised by undertaking cleaning and disinfection of equipment. All debris, plant fragments and mud should first be scrubbed off footwear and rinsed with water. Follow the Clean, Check, Dry Process - disinfection shall comprise soaking in a bleach solution (1 measure of household bleach to 9 measures of water) for 15 minutes or using Virkon solution (1mg/ml) for 1 minute. Fabrics can be washed on a 40' C cycle (with detergent, ensuring sufficient rinsing). All used disinfectants should be disposed of appropriately.	
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[Severn Estuary / Môr Hafren SPA] Feature 7 - Internationally important population of regularly occurring migratory species: <i>Wintering Dunlin</i> <i>Wintering Redshank</i> <i>Wintering Shelduck</i> <i>Wintering Gadwall</i>	<u>Disturbance (Acoustic and Visual):</u> <i>Wintering Dunlin, Redshank, Shelduck, Gadwall</i> – Potential for visual and acoustic disturbance and displacement from human and machinery activity should installation occur within the wintering bird season (October to March inclusive). Disturbance / displacement risks reduced food intake and/or increased energy expenditure that may result in morbidity / mortality, particularly during extreme cold weather events. However, restoration area only occurring over a very minor area (0.026%) of the overall Severn Estuary; as such, alternative areas would always be available.	YES	Polder installation is programmed during the summer months (June to August inclusive) to avoid the overwintering bird season (October to March inclusive). As such, sensitive programming of the works avoids effects on the overwintering bird populations. Consequently, there are no effects on the overwintering bird populations.	YES
[Severn Estuary / Môr Hafren SPA] Feature 8 - Assemblage of wintering birds (regularly supports over 20,000 waterfowl)				

[Severn Estuary / Môr Hafren Ramsar] Feature 11 - Bird species: It is also of particular importance for migratory birds during spring and autumn.	<u>Disturbance (Acoustic and Visual)</u> – Passage waders may be affected by disturbance / displacement during the spring / autumn migration periods; comprising: ringed plover, dunlin, whimbrel and redshank. Ramsar criteria were revised in 2005 to include a nationally important population of breeding lesser black-backed gull.	YES	Currently installation works are programmed for June to August with an anticipated 6-week installation schedule. Consequently, works are likely to avoid the spring migration period (late March to May). However, installation is likely to occur during the breeding bird season (March to June inclusive) and the autumn passage period (August to October inclusive). The PEA [Table 5] did not record any suitable habitat for breeding lesser black-backed gull on or adjacent to site. The proposed restoration area is located within the Peterstone Wentlooge WeBS survey cell. The installation area only extends across one-third (1.6km) of the 4.6km wide survey cell; as such, disturbance / displacement may not be applicable to the whole cohort. Of the relevant passage species, the mean counts within the Peterstone Wentlooge WeBS survey cell for the proposed construction period are summarised below. <table><tr><th></th><th>2017 [Jun-Aug]</th><th>2018 [Jun-Aug]</th><th>2019 [Jun-Aug]</th><th>2020 [Jun-Aug]</th><th>2021 [Jun-Aug]</th><th>2022 [Jun-Aug]</th><th>Annual Mean Count [Jun-Aug]</th></tr><tr><td>Dunlin</td><td>0</td><td>2</td><td>2</td><td>4</td><td>7</td><td>0</td><td>3</td></tr><tr><td>Redshank</td><td>0</td><td>51</td><td>36</td><td>16</td><td>95</td><td>3</td><td>34</td></tr><tr><td>Ringed Plover</td><td>0</td><td>0</td><td>1</td><td>3</td><td>85</td><td>0</td><td>15</td></tr><tr><td>Whimbrel</td><td>17</td><td>19</td><td>15</td><td>14</td><td>3</td><td>9</td><td>13</td></tr></table> Taking a precautionary approach, it is assumed that passage waders may be present within the installation area between June and August inclusive. Weekly ornithological checks prior to and throughout installation by a Suitably Qualified Ecologist (SQE) for passage waders and breeding birds (lesser black-backed gull) are recommended. Breeding Birds - Should any breeding lesser black-backed gulls (or other birds) be recorded displaying breeding behaviour, suitable and appropriate buffer zones shall be employed to ensure no disturbance. If necessary, certain components of the installation will be scheduled to commence post-fledging. The proposed restoration area is exposed to recreational users and their dogs; as such, the potential for frequent disturbance suggests breeding within the installation area is unlikely and no significant effect is predicted. Passage Waders – Should any passage waders in excess of 1% of the Severn Estuary SPA / Ramsar population be present within the 100m disturbance radius (or 2% within 300m) of the installation works (including access), as recorded by the SQE during ornithological checks, works within the disturbance radius shall not progress until the area is clear. Installation may continue outside the buffer zone pending approval of the SQE.		2017 [Jun-Aug]	2018 [Jun-Aug]	2019 [Jun-Aug]	2020 [Jun-Aug]	2021 [Jun-Aug]	2022 [Jun-Aug]	Annual Mean Count [Jun-Aug]	Dunlin	0	2	2	4	7	0	3	Redshank	0	51	36	16	95	3	34	Ringed Plover	0	0	1	3	85	0	15	Whimbrel	17	19	15	14	3	9	13	YES
	2017 [Jun-Aug]	2018 [Jun-Aug]	2019 [Jun-Aug]	2020 [Jun-Aug]	2021 [Jun-Aug]	2022 [Jun-Aug]	Annual Mean Count [Jun-Aug]																																					
Dunlin	0	2	2	4	7	0	3																																					
Redshank	0	51	36	16	95	3	34																																					
Ringed Plover	0	0	1	3	85	0	15																																					
Whimbrel	17	19	15	14	3	9	13																																					

4.3 Concluding the appropriate assessment of the project alone

(a) If the right hand column of Table 4.1 and Table 4.2 (if applicable) is 'YES' for all features	It has been ascertained that the proposal, when considered alone, will not adversely affect the integrity of any Natura 2000 sites.
(b) If there are any 'NO's in the right hand column of Table 4.1 that have not been resolved to 'YES' through mitigation measures identified in Table 4.2	It has not been ascertained that the proposal, when considered alone, will not adversely affect the integrity of one or more Natura 2000 sites.
(c) Are there any residual effects of the project (net of any mitigation measures identified) which, though insignificant on their own, could be significant if considered in combination with the effects of other plans or projects?	YES

5 In combination assessment

5.1 Identifying possible in combination effects

BLUE impact pathway from Table 3.2 and/or Residual effect (from appropriate assessment in section 4)	Natura 2000 site feature(s) concerned	Other plans/projects with effects that might interact with the effects of the project to render its effects significant (if any)	Nature of the in-combination effect (if any)	Is there likely to be any significant in-combination effect, in view of the site's conservation objectives?
<u>Pollution Incident</u> – During polder installation fish features may be affected by construction vehicles in the event of a pollution incident. Plant access creates a potential pathway for a pollution incident, through release of toxic contaminants via access to install the polders.	Severn Estuary / Môr Hafren SAC – Estuaries, Mudflats and Sandflats not covered by seawater at low tide, Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>), Sea lamprey (<i>Petromyzon marinus</i>), River lamprey (<i>Lampetra fluviatilis</i>), Twaite shad (<i>Alosa fallax</i>). Severn Estuary / Môr Hafren Ramsar – Estuaries, Mudflats and Sandflats not covered by seawater at low tide, Atlantic salt meadows, fish species: Atlantic salmon, sea trout, sea lamprey, river lamprey, allis shad, twaite shad and European eel. River Usk / Afon Wysg SAC – sea lamprey, twaite shad, Atlantic	NRW's Marine Licensing Team and Cardiff Council were consulted on plans and projects within the locality that may have an in-combination assessment with the proposed restoration project. No projects have been identified that could contribute to in-combination effects. The SMP2 was the only plan identified with potential for in-combination effects; however, no works are proposed so no in-combination effect via pollution incidents is predicted.	No potential for in-combination effect identified. Appropriate mitigation secured via HRA and EAP.	NO

BLUE impact pathway from Table 3.2 and/or Residual effect (from appropriate assessment in section 4)	Natura 2000 site feature(s) concerned	Other plans/projects with effects that might interact with the effects of the project to render its effects significant (if any)	Nature of the in-combination effect (if any)	Is there likely to be any significant in-combination effect, in view of the site's conservation objectives?
	salmon, allis shad. River Wye / Afon Gwy SAC – sea lamprey, twaite shad, Atlantic salmon, allis shad.			
<u>Zonation and relative abundance of typical and notable species of Atlantic salt meadows / Temporary Deterioration of Habitat Condition:</u> <u>Coastal Squeeze</u> [included for completeness; re. SMP2] – Similarly, coastal squeeze may potentially affect Atlantic salt meadows and intertidal mudflats over the long-term.	Severn Estuary / Môr Hafren SAC - Mudflats and Sandflats not covered by seawater at low tide, Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>). Severn Estuary / Môr Hafren Ramsar - Mudflats and Sandflats not covered by seawater at low tide, Atlantic salt meadows.	NRW's Marine Licensing Team and Cardiff Council were consulted on plans and projects within the locality that may have an in-combination assessment with the proposed restoration project. No projects have been identified that could contribute to in-combination effects. The SMP2 was the only plan identified with potential for in-combination effects. The SMP2 HRA identifies coastal squeeze impacts that could be considered in-combination with the proposed habitat restoration project. Current coastal squeeze losses to the baseline are caused by the existence of the flood defence structure (in conjunction with rising sea-levels), which has been assessed by plan level HRA under the SMP2. This concluded	No potential for in-combination effect identified.	NO

BLUE impact pathway from Table 3.2 and/or Residual effect (from appropriate assessment in section 4)	Natura 2000 site feature(s) concerned	Other plans/projects with effects that might interact with the effects of the project to render its effects significant (if any)	Nature of the in-combination effect (if any)	Is there likely to be any significant in-combination effect, in view of the site's conservation objectives?
		adverse effect on site integrity on its own. Therefore, the SMP (plan) cannot be considered 'in-combination' with the current project. Only losses arising from the current project, or projects not otherwise considered in the SMP, should be considered in-combination.		
<u>Zonation and relative abundance of typical and notable species of Atlantic salt meadows / Temporary Deterioration of Habitat Condition:</u> <i>Polder Installation</i> – temporary trampling may affect the condition and relative abundance of typical and notable species of Atlantic salt meadow during polder installation if reasonable precautions are not undertaken. Subsequent effects may occur through	Severn Estuary / Môr Hafren SAC - Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>). Severn Estuary / Môr Hafren Ramsar - Atlantic salt meadows.	NRW's Marine Licensing Team and Cardiff Council were consulted on plans and projects within the locality that may have an in-combination assessment with the proposed restoration project. No projects have been identified that could contribute to in-combination effects. The SMP2 was the only plan identified with potential for in-combination effects; however, no works are proposed so no in-combination effect via pollution incidents is predicted.	No potential for in-combination effect identified. Appropriate mitigation secured via HRA and EAP.	NO

BLUE impact pathway from Table 3.2 and/or Residual effect (from appropriate assessment in section 4)	Natura 2000 site feature(s) concerned	Other plans/projects with effects that might interact with the effects of the project to render its effects significant (if any)	Nature of the in-combination effect (if any)	Is there likely to be any significant in-combination effect, in view of the site's conservation objectives?
any ongoing maintenance activities.				
<u>Zonation and relative abundance of typical and notable species of Atlantic salt meadows / Temporary Deterioration of Habitat Condition:</u> /NNS – relative abundance of typical and notable species of Atlantic salt meadows could potentially be affected by the introduction of Invasive Non-Native Species (INNS).	Severn Estuary / Môr Hafren SAC - Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>). Severn Estuary / Môr Hafren Ramsar - Atlantic salt meadows.	NRW's Marine Licensing Team and Cardiff Council were consulted on plans and projects within the locality that may have an in-combination assessment with the proposed restoration project. No projects have been identified that could contribute to in-combination effects. The SMP2 was the only plan identified with potential for in-combination effects; however, no works are proposed so no in-combination effect via pollution incidents is predicted.	No potential for in-combination effect identified. Appropriate mitigation secured via HRA and EAP.	NO
<u>Disturbance (Acoustic and Visual)</u> – Passage waders may be affected by disturbance / displacement during the spring / autumn	Severn Estuary / Môr Hafren Ramsar - Bird Species: It is also of particular importance for migratory birds during spring and autumn.	NRW's Marine Licensing Team and Cardiff Council were consulted on plans and projects within the locality that may have an in-combination assessment with the proposed restoration project.	No potential for in-combination effect identified. Appropriate mitigation secured via HRA and EAP.	NO

BLUE impact pathway from Table 3.2 and/or Residual effect (from appropriate assessment in section 4)	Natura 2000 site feature(s) concerned	Other plans/projects with effects that might interact with the effects of the project to render its effects significant (if any)	Nature of the in-combination effect (if any)	Is there likely to be any significant in-combination effect, in view of the site's conservation objectives?
migration periods; comprising: ringed plover, dunlin, whimbrel and redshank. Ramsar criteria were revised in 2005 to include a nationally important population of breeding lesser black-backed gull.		No projects have been identified that could contribute to in-combination effects. The SMP2 was the only plan identified with potential for in-combination effects; however, no works are proposed so no in-combination effect via pollution incidents is predicted.		
(a) If the right hand column is 'NO' for all rows		The project, when considered in-combination with other plans and projects, is either not likely to have a significant effect on, or will not adversely affect the integrity of any Natura 2000 site.		
(b) If any rows in the right hand column are 'YES' or 'DON'T KNOW'		The project is likely to have a significant effect in combination with other plans or projects.		

5.2—Addressing in-combination effects

In combination effect	Describe any conditions, restrictions or other measures, if any, applicable to the subject project, and/or to the other plans/projects giving rise to the in combination effect, which could remove the risk of adverse effects on the Natura 2000 site features. Include details of how such measures would be applied, and who would	Taking into account any additional measures identified and how they would
------------------------------	---	--

	be responsible for applying them.	be applied, can adverse effects on site features from in-combination effects be ruled out? f
(a) If the right hand column is 'YES' in all cases	It can be concluded that the project will not adversely affect the integrity of any Natura 2000 sites, either alone or in combination with other plans or projects.	
(b) If any row is 'NO' in the right hand column	It cannot be concluded that the project will not adversely affect the integrity of any Natura 2000 sites, when considered in combination with other plans or projects.	

6. Conclusion

HRA is not required because the whole of the project is directly connected with or necessary to the management of one or more Natura 2000/Ramsar sites, for the purposes of conserving the habitats or species for which the site(s) is/are designated, <u>and</u> the project is not likely to have a significant effect on any other Natura 2000/Ramsar sites. (As documented in section 2.1 and 2.2 of this form)	
HRA is not required because there is no conceivable impact pathway to any Natura 2000/Ramsar site (As documented in section 2.3 of this form)	
This project is a renewal of a current permission which complies with NRW agreed criteria for ruling out significant effects of a renewal without conducting a project-specific LSE test. Therefore it is considered not likely to have a significant effect on any Natura 2000/Ramsar sites, either alone or in-combination with other plans and projects. (As documented in section 3.1 of this form)	
The project has been screened for likelihood of significant effects and, taking account of the advice received from protected sites advisors, is considered not likely to have a significant effect on any Natura 2000/Ramsar site (As documented in section 3.2 of this form, or section 5 if applicable)	
In light of the conclusions of an appropriate assessment, and taking account of the advice received from protected sites advisors, it has been established that the project will not adversely affect the integrity of any Natura 2000/Ramsar site, taking into account any conditions or restrictions as applicable, either alone or in-combination with other plans and projects. (As documented in section 4 of this form, and section 5 if applicable)	X
In light of the conclusions of the appropriate assessment, it has <u>not</u> been ascertained that the project will not adversely affect the integrity of any Natura 2000/Ramsar site, as documented in section 4 of this form, and section 5 is applicable. Approval for the project <u>cannot</u> be given unless either: the project specification, and/or the terms under which it might be approved, are modified so as to remove the risk of	

adverse effects, and a revised HRA report is prepared, or the project satisfies the requirements of Article 6(4) of the Habitats Directive, an Article 6(4) Statement of Case is prepared (OGN 200 Form 3) and submitted for consideration by the appropriate authority, normally Welsh Ministers	
Signed: Name: Position: Date:	

7. Consultation with protected sites advisor(s) and how sections 2, 3, 4 and 5 of this HRA report (as applicable) take into account that advice.

Relevant section of the HRA report	Date(s) of correspondence* and any meeting(s) with protected sites advisor(s)	Description of how the comments from protected sites advisors have been taken into account
2, 3, 4 and 5	Email thread of correspondence between NRW specialists regarding Coastal Squeeze impacts. Meeting (28/07/2023) between NRW specialists including Dr Nicola Rimington regarding Assessment of Coastal Squeeze. Also attached is a summary document of Initial Advice on the Assessment of Coastal Squeeze (27/07/23)	<i>It is argued that the polders will have no material effect on coastal squeeze. There sufficient grounds to rule out adverse effect on site integrity due to the polders project alone. Current coastal squeeze losses to the baseline are caused by the existence of the flood defence structure (in conjunction with rising sea-levels), which has been assessed by plan level HRA under the SMP2. This concluded adverse effect on site integrity on its own. Therefore, the SMP (plan) cannot be considered 'in combination' with the current project. Only losses arising from the current project, or projects not otherwise considered in the SMP, should be considered in combination. In conclusion, we think that adverse effects on site integrity due to coastal squeeze could be ruled out at the Appropriate Assessment stage.</i>
3	Email thread of correspondence between project team and NRW specialists regarding HRA and assessments of mudflats and sandflat losses. Meeting (24/08/2023) between NRW Project Manager (Chloe James) and specialists (Iain Fairley, Nicola Rimington, Ben Wray) to discuss HRA and assessments for mudflats and sandflat losses.	<i>The case is made that the project will, over time, benefit both habitats present. By repairing and extending the polders along this frontage, the aim is to promote sediment deposition in the first instance, to reduce or ideally reverse the erosive trends currently being experienced. This should have benefits for the mudflat feature initially, and then saltmarsh may develop in areas where the conditions allow. Over time, with sea-level rise, the saltmarsh that has developed within the repaired/extended polders may be unable to accrete vertically, quickly enough to keep pace with rising water levels. With increased tidal inundation, storms/wave action could be more impactful and promote increased erosion. At this point we may see an increase in mudflat again and saltmarsh loss.</i>

8. Conservation Technical Specialist's comments

I have reviewed the HRA documented in this form and confirm that I agree/do not agree* with its findings.
(*strike out as applicable)

Additional comments (if any):

Signed:

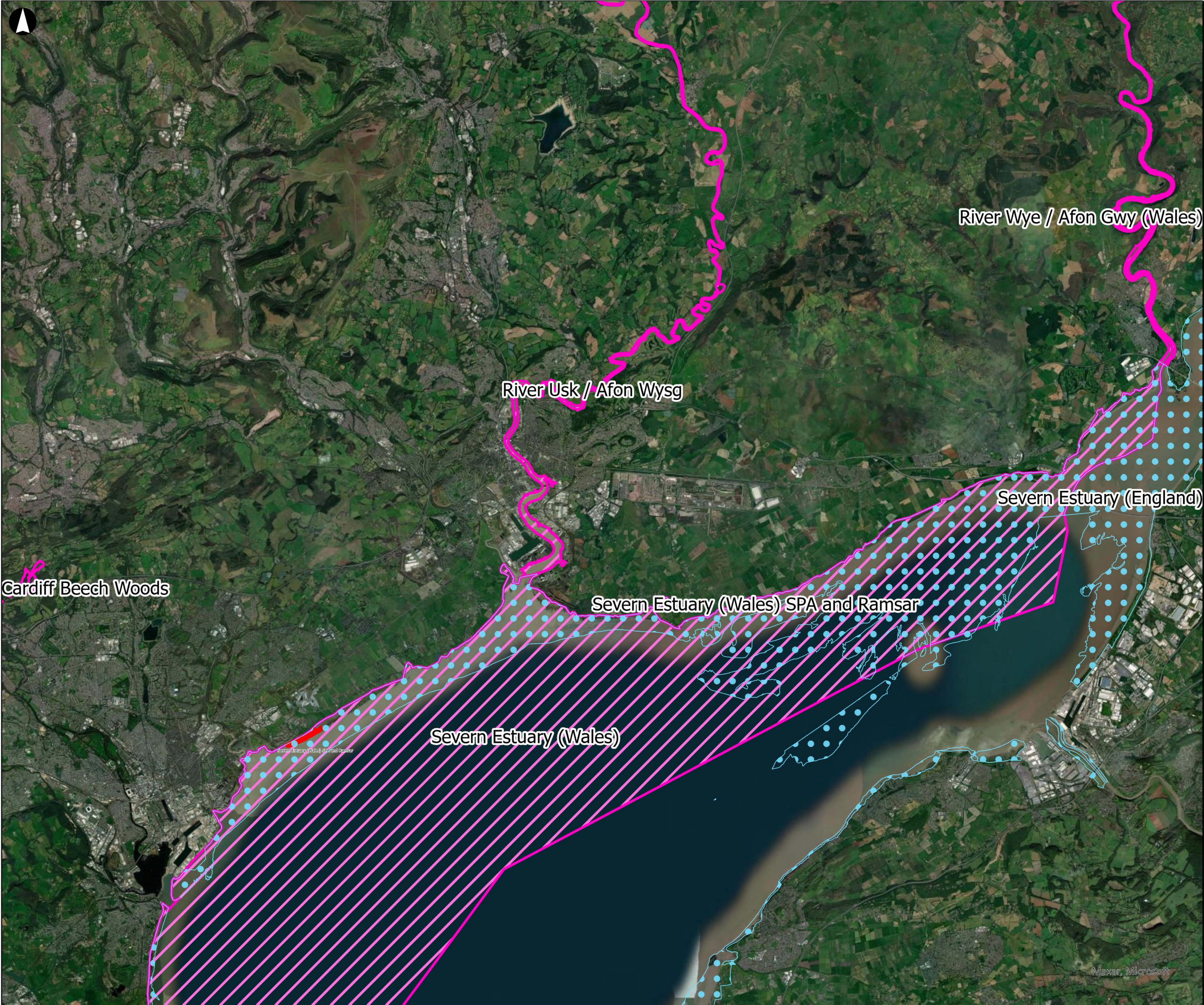
Name:

Position:

Date:

Annex A- Environmental Constraints and Opportunities Plans (ECOPs)





Legend

New Polder Fencing

Repair Of Existing Polder

Special Area of Conservation (SAC)

Special Protection Area (SPA) and Ramsar

Natural Resources Wales / Disclaimer for flood and coastal erosion risk maps.
https://naturalresources.wales/flooding/disclaimer-forourflood-and-coastal-erosion-risk-mapping

Coordinate System: British National Grid

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Kilometers

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P01	20/12/2023	BF/RSJ	SC	GM
Rev	Date	By	Chkd	Appd

ARUP

4 Pierhead Street
Caerdydd / Cardiff
CF10 4QP
Tel +44 29 2047 3727
www.arup.com

Cleient / Client

Cyfoeth Naturiol Cymru
Natural Resources Wales

Enw a Rhif y Prosiect CNC / NRW Project Name and Number

Rhymney Great Wharf
Polders-290063

Teitl Lluniad / Drawing Title

Environmental Constraints and
Opportunities- European Sites

Graddfa yn A3 / Scale at A3

1:130,000

Rhan / Role

Environmental

Addaswydd / Suitability

Draft

Rhif y Prosiect Arup / Arup Project Number

Adolygiad / Rev

290063

P01

Rhif y Lluniad / Drawing Number

290063-ARP-XX-DR-ZX-0202

Mae'r cynllun a'r lluniad yma yn gyfrinachol. Mae pob hawl oddi fewn iddo yn cynnwys yr hawlfraint yn eiddo i Cyfoeth Naturiol Cymru ac ni ddylid ei ddarparu i eraill na'i atgynhyrchu heb ganiatâd ymlaen llaw gan Cyfoeth Naturiol Cymru 2023.
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Annex B- NRW Coastal Squeeze Guidance Note

Assessment of Coastal Squeeze

Guidance note

Reference number: GN 062

Document Owner: Head of Business, Natural Resources Management

What is this document about?

This document will support anyone proposing to undertake works to coastal structures that may affect the National Site Network (Special Areas of Conservation or Special Protection Areas). It will enable users to consider the implications of coastal squeeze in Habitats Regulations Assessments and will explain how the information contained within the Shoreline Management Plans can support the assessment process.

Who is this document for?

Anyone proposing to undertake works to coastal structures within or adjacent to a Special Area of Conservation or Special Protection Area, and anyone advising on, assessing or regulating those works.

Contact for queries and feedback

Marine and Coastal Policy and Planning Team MCPPT@cyfoethnaturiolcymru.gov.uk

Version History

Document Version	Date Published	Summary of Changes
1.0	27/6/2022	Document published

Review Date: 2 years from publication or sooner if required

To report issues or problems with this guidance [contact Guidance Development](#)

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1. Introduction

This guidance provides a definition of coastal squeeze, informs users when a coastal squeeze assessment may be required, and explains how that assessment can be undertaken.

This document is for anyone who may need to undertake or advise on a coastal squeeze assessment or any competent authority required to take account of such information as part of a [Habitats Regulations Assessment \(HRA\)](#). An HRA may be required under Regulation 63 of Conservation of Habitats and Species Regulations 2017 as amended (known as the Habitats Regulations). Regulation 64 sets out the provisions for the test of alternatives and Imperative Reasons of Overriding Public Interest (IROPI) test.

Coastal squeeze may also need to be assessed to inform compliance assessments under the Water Environment (WFD) (England and Wales) Regulations 2017, and whilst this guidance note focusses on HRA, users should also consider any requirements under WFD.

The need for this guidance has arisen since Welsh Government (WG) issued a Clarification Note on the role of the National Habitat Creation Programme in 2018, further amended by their revised [Clarification Note published in 2021](#). Prior to the publication of this advice by WG, coastal squeeze had only been considered at the plan level via the HRAs for the four Shoreline Management Plans (SMPs) wholly or partly within Wales.

[Shoreline Management Plans \(SMPs\)](#) set out a shared strategic approach for managing the coastline from coastal flooding and erosion risks. Their aim is to reduce the risks to people, the developed, historic and natural environments over the next century. SMPs split the coastline into small sections (called policy units) and describe how these sections will be managed over the short-term (2005-2025), medium-term (2025-2055), and long-term (2055-2105).

There are four management policies that can be applied to each policy unit, for each period of time:

- Hold the line (HTL) by maintaining or changing the existing standard of protection
- Advance the line (ATL) by building new defences on the seaward side of the original defences (although none applied in Wales)
- Managed realignment (MR) which allows the shoreline to move backwards and forwards, with management to control or limit the movement
- No active intervention (NAI) where there is no investment in coastal defences and natural processes are allowed to continue to create an evolving coastline

The HRAs of all four SMPs concluded that there would be adverse effects to the integrity of the National Site Network because of coastal squeeze habitat losses associated with 'Hold the line' policies. As a result of adverse effects being identified, the SMPs were subject to the tests of alternatives and Imperative Reasons of Overriding Public Interest (IROPI), and compensatory measures were required. The strategic compensation mechanism for the SMPs was identified as the National Habitat Creation Programme (NHCP), which Natural Resources Wales (NRW) delivers on behalf of WG. The NHCP

provides compensatory habitat for impacts associated with Local Authority and NRW flood and coastal erosion schemes.

The SMPs often provide further detail on specific management intent for individual policy units which complements the headline policy. For example, in a long policy unit identified as 'No active intervention' the description of the policy intent may state that there are short sections within the policy unit which are currently defended where ongoing investment could be made. Therefore, projects to invest in defences in those locations may still be in line with SMP policy, but the HRA of the SMP won't have considered the impacts of such works, because coastal squeeze impacts were only assessed in 'Hold the line' Policy units.

The 2018 WG Clarification Note required coastal squeeze to be assessed at the project level, and where necessary, project level HRAs and IROPI cases were required to be undertaken and submitted to WG for approval. The [updated Clarification Note published in 2021](#) indicates WG's policy that coastal squeeze assessments should not be applied to maintenance activities. This guidance note aims to explain when a coastal squeeze assessment may be required in the light of WG policy.

Some works to coastal structures will be consented via Marine Licensing, Town and Country Planning, Flood Risk Activity Permits or Site of Special Scientific Interest (SSSI) consents/assents. Even without these consents, public bodies may be required to assess their own activities under the Habitats Regulations as part of their [competent authority role](#).

This guidance therefore describes potential assessment requirements, and technical advice on how to undertake a coastal squeeze assessment for a project.

- Section 1 provides a definition of coastal squeeze, when it might occur and how to screen for potential coastal squeeze impacts.
- Section 2 sets out how to consider coastal squeeze in the context of the HRA process.
- Section 3 provides information on regulation and permitting where coastal squeeze may need to be considered.
- Section 4 provides technical advice on the assessment of coastal squeeze.
- Section 5 provides supporting information.

This guidance will be reviewed as necessary to take account of any change in policy or legislation that may lead to a change in approach to coastal squeeze assessment.

1.1 What is coastal squeeze?

A recent project, called '[What is Coastal Squeeze?](#)' aimed to improve understanding of coastal squeeze, and to describe best practice for assessing its past and future impacts at different scales (e.g. plan level, strategy level and scheme/project level). The 'What is Coastal Squeeze?' report was commissioned by the Joint Flood and Coastal Erosion Risk Management Research and Development Programme, which is jointly overseen by Defra, the Environment Agency, NRW and the WG on behalf of all risk management authorities in England and Wales. For consistency, and where appropriate, this guidance will use and refer to the 'What is Coastal Squeeze?' report, including the definition set out below.

Definition of coastal squeeze

Coastal squeeze is 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.

It is essential this definition is read together with the points of clarification below.

Points of clarification

1. 'Anthropogenic (man-made) structures' includes features that act as barriers to the inland progression of marine waters and habitats. These would include flood and coastal erosion structures, quay walls and road/railway embankments. 'Anthropogenic actions' include activities that artificially prevent the landward transgression of habitats.
2. 'Natural habitats' include all relevant Annex I coastal/intertidal habitats found in the UK as defined in policy and legislation (including Natural Environment and Rural Communities Act s41 priority habitat (England) or Environment Act Section 7 for Wales). The relevant habitats will need to be identified at a site level.
3. Habitat loss is considered in terms of area of the habitat. The area should include changes arising from frontal retreat (for example, of a saltmarsh edge) as well as internal erosion (for example, expansion of creeks within marshes).
4. Coastal processes relevant to identifying coastal squeeze should include those which, under natural unconstrained conditions, can lead to the landward migration of habitats under a scenario of sea level rise - such as waves for shingle beaches, winds for aeolian dunes, and tidal inundation for saltmarshes.
5. The assessment of coastal squeeze in estuaries should consider whether the extent of any intertidal islands is affected by flood defences on the islands themselves or within the wider estuary. This consideration should also take into account the role of natural changes in channel position over time which can influence the size and location of intertidal islands.
6. Coastal squeeze as defined excludes:
 - i. the historic drainage and land claim of habitat landwards of currently existing structures.
 - ii. Other impacts of hard defences such as reductions in sediment supply caused by protecting eroding sediment sources or interrupting longshore transport pathways.
 - iii. Impacts of other human activity/structures on habitats, such as alteration of estuary channel morphology due to dredging, training walls or piers, or impacts on habitat quality due to management practices or pollution.

- iv. Other natural or human causes of habitat loss unrelated to creating barriers to landward transgression, for example, the lateral movement of channels which may be unrelated to sea level rise and, while it would erode seaward edges of habitats, would not create landward transgression even under unconstrained condition.
- v. Habitat loss against natural steeply rising land (that is, sloping coastal hinterlands) – such losses may need to be considered as a baseline scenario ('without defences') against which to judge coastal squeeze losses. It should be noted that some areas of rising land formed from unconsolidated sediments may erode relatively rapidly in the future to provide accommodation space for habitats. In addition, narrow strips of higher ground which divide a low-lying hinterland from the sea may also be subject to erosion, and therefore the low-lying hinterland may provide space for habitats to develop.

The above impacts should be assessed, described and accounted for separately, even though the remedial measures may be linked or packaged with those taken to address coastal squeeze.

- 7. Sea level rise is taken to be the net trend in relative sea level resulting from global eustatic variations (changes in ocean volume) and regional or local isostatic change (changes in land level). Sea level rise excludes changes in water levels due to human interventions, for example, dredging, land claim, creation of flood storage/managed realignment areas. If these changes are relevant to an area, they should be assessed separately.
- 8. Assessing coastal squeeze should consider whether there is deterioration in habitat quality or changes in species composition which may be occurring as a result of human structures/actions impeding the landward transgression of habitats. For example, in saltmarshes, sea level rise might lead to high marsh communities being replaced with lower marsh communities. These changes may occur ahead of, or at the same time as, areal losses. See clarification point 2 above, and the 'What is Coastal Squeeze?' report for a list of coastal/intertidal habitats that need to be considered when assessing coastal squeeze.

1.2 When and where might coastal squeeze occur?

Based on the definition in section 1.1 above, coastal squeeze may occur when all of the following apply:

- Structures or coastal management activities (such as shingle re-profiling) fix the position of the coast.
- Sea-level is rising/is predicted to continue rising.
- There is a National Site Network designated site with Annex 1 habitats present seaward of the defence.
- The habitats would be able to migrate landwards 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 relatively quickly). This can include land behind defences which is currently developed. This is because over the long term, it is expected that there would be degradation and then

removal of assets/structures as they become exposed to regular flooding and/or erosion, and that the land would be remediated to allow habitat to develop.

In the HRAs of the SMPs the policy units with a preferred policy of 'hold the line' were considered to have the potential to lead to coastal squeeze effects. 'No active intervention' policy units were not expected to lead to coastal squeeze effects as a result of the plans because no action was proposed. For 'managed realignment' policy units, it was not possible to undertake a coastal squeeze assessment at the plan level as details of how managed realignment might be implemented were not included. Coastal squeeze assessments were therefore deferred to the project level for managed realignment areas.

Where the proposed project, activities or scheme are within a 'hold the line' policy unit, the SMP HRAs are the best available initial source of evidence to determine whether coastal squeeze impacts were identified at the plan level (see section 5 and Annex 1 for further information). In addition, the fact that the SMP considered alternative policy options, and whether there were imperative reasons of overriding public interest to justify a 'hold the line' policy, means they can be used to support stages 3 and 4 of the HRA process at the project level (see Section 2).

For works outside a 'hold the line' policy unit, a project level assessment may be needed (see section 4), as well as provision of evidence to support stages 3 and 4 of the HRA.

1.3 Why should coastal squeeze be assessed?

Fundamentally, maintaining a particular coastal alignment whilst sea-levels continue to rise will lead to narrowing of the intertidal/coastal zone, and loss of habitat. The Habitats Regulations requires that the extent of designated Annex 1 habitats is stable or increasing. Therefore, projects or activities which prevent the natural ability of habitats to migrate landwards in response to sea-level rise are likely to lead to adverse effects or deterioration of the National Site Network.

Furthermore, coastal defences can lead to hydro morphology pressures which may prevent the achievement of good ecological status under the Water Environment (WFD) (England and Wales) Regulations 2017, or good ecological potential for water bodies classified as heavily modified. In addition to the HRA, a WFD compliance assessment will also be required, and similar evidence will be required to support both assessments. It is recommended that both assessments are undertaken in parallel. More information on how to carry out a WFD assessment is available here: [Natural Resources Wales / How to carry out a Water Framework Directive \(WFD\) assessment for a marine licence application](#).

As well as complying with WG's 2021 clarification note to undertake project level assessments for relevant projects (see section 1.4, Screening Step 2), the coastal squeeze assessment is needed to inform the HRA process and check whether significant or adverse effects are likely. If a conclusion of adverse effect on site integrity is reached, the coastal squeeze assessment will also inform consideration of what is required in terms of compensatory measures (see Section 2, Stage 5)

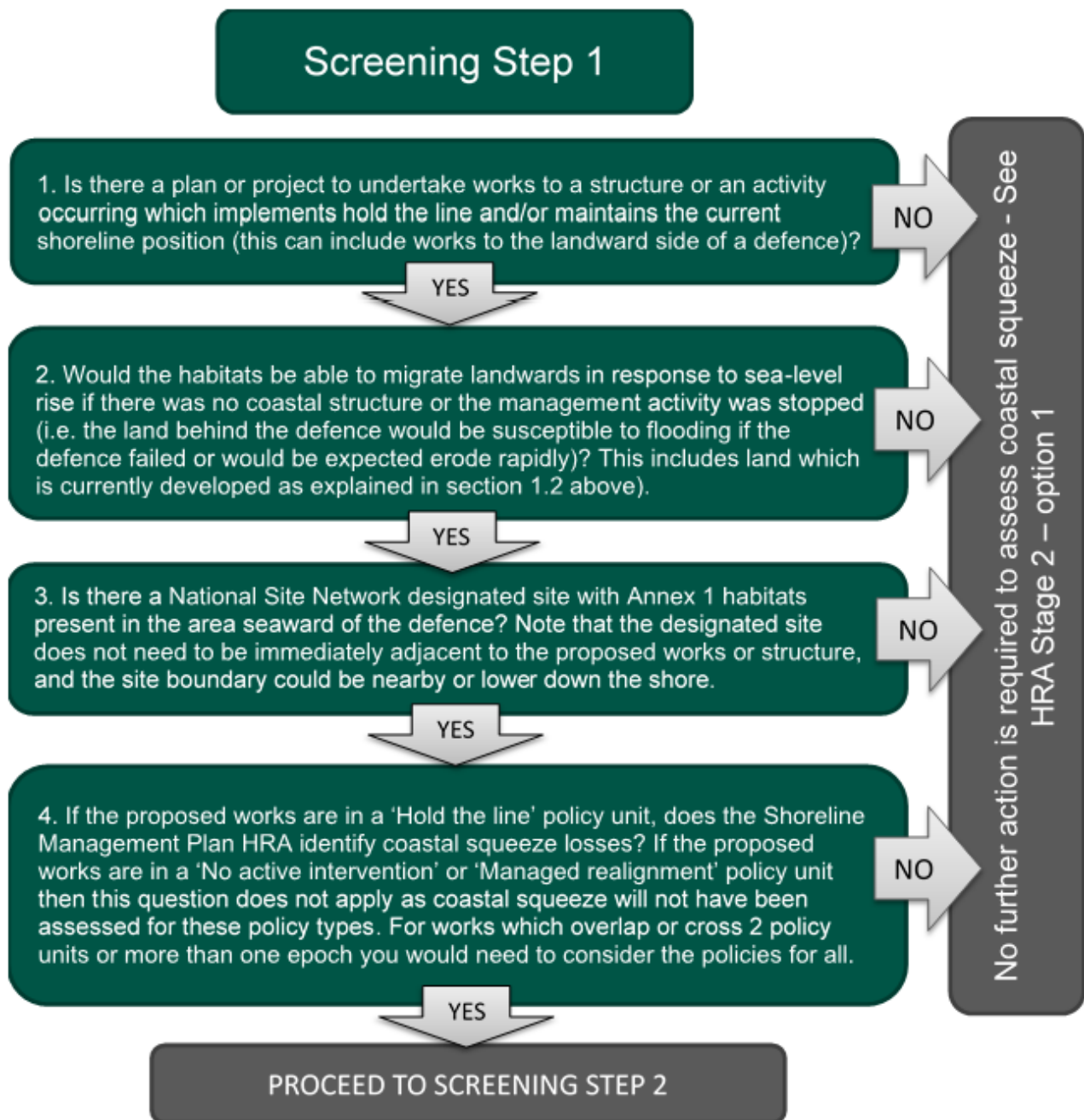
Screening for potential coastal squeeze

Screening Step 1 – is there potential for coastal squeeze to occur?

If the answer to any of the questions below is no, no further action is required to assess coastal squeeze. If the answer to all questions is yes, then proceed to screening step 2 (section 1.4.1). This process is illustrated in Figure 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 position (this can include works to the landward side of a defence)? Note that maintenance activities are considered at screening step 2.
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 as explained in section 1.2 above).
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.
4. If the proposed works are in a 'Hold the line' policy unit, does the SMP HRA identify coastal squeeze losses? If the proposed works are in a 'No active intervention' or 'Managed realignment' policy unit then this question does not apply as coastal squeeze will not have been assessed for these policy types. The preferred policy may change over time. Consideration should be given to the policy periods (SMP epochs) relevant to the proposed lifespan of the works. For works which overlap or cross 2 policy units or more than one epoch you would need to consider the policies for all.

Figure 1 Flow chart to illustrate Screening Step 1



Screening Step 2 – are the proposed works considered to be maintenance?

In the light of WG's 2021 Clarification Note, activities considered to fall within the definition of 'maintenance' (as set out below) are not required to be assessed for coastal squeeze at the project level. If the proposed activity falls within this definition, then this will need to be recorded in the HRA at the Test of Likely Significant Effect Stage, (see section 2, stage 2 below).

If the project is not within the definition of maintenance, this should be recorded at the Test of Likely Significant Effect Stage of the HRA, and the HRA should proceed to Stage 3: Appropriate Assessment. This process is illustrated in Figure 2.

Definition of maintenance

Maintenance works are defined as the “upkeep, repair or reasonable improvement of works”. This means the maintenance need not be like for like, but the work must not be a “significant alteration” to what is already there.

Explanation

“Reasonable improvement” and “significant alteration” within the boundary of the existing structure are not defined and will need to be considered on a case-by-case basis. See the examples provided below.

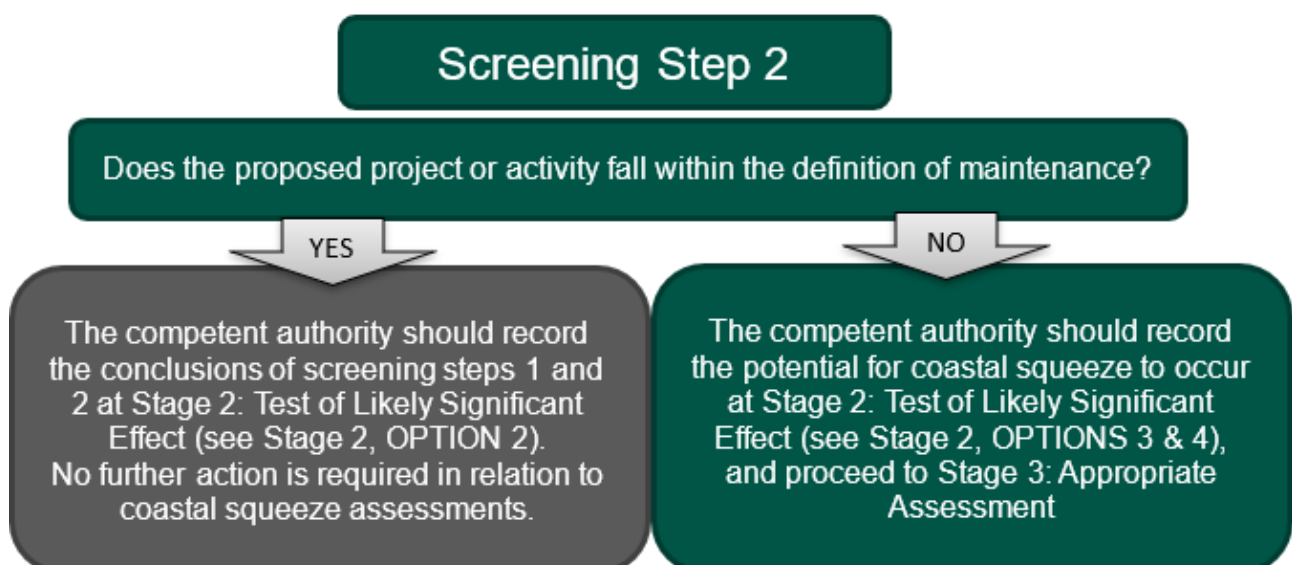
Examples of ‘reasonable improvements’ not considered to be ‘significant alternations’:

- Replacement of a timber flap valve with a steel or plastic flap valve
- Use of soil rather than peat to repair an embankment
- Repair of a sea wall or rock revetment with similar hard materials that perform the same function

Likely exclusions from ‘reasonable improvements’ which would be considered to be ‘significant alterations’

- Protection of an earth embankment with rip-rap
- Works which increase the footprint of the structure (this usually includes any works which increase the crest height of a structure)
- Extensive or complete replacement of a structure

Figure 2 Flow Chart to illustrate Screening Step 2



2. Habitats Regulations Assessments

Coastal squeeze may need to be assessed as part of a HRA for works proposed by NRW or others, for works regulated by NRW or others, and for works which NRW needs to advise on as the Statutory Nature Conservation Body. Therefore, the stages described below are intended to be generally applicable to whoever is carrying out a HRA as the competent authority, those providing the information to inform the HRA, or those advising on the HRA.

There are six stages in total, although many projects will not need to proceed beyond stages 2 or 3. Each stage includes a description and flow chart to explain what to do depending on the nature and location of the project in relation to SMP policy.

This guidance specifically applies where coastal squeeze needs to be considered. Welsh Government's website provides [guidance on the HRA process](#) in general.

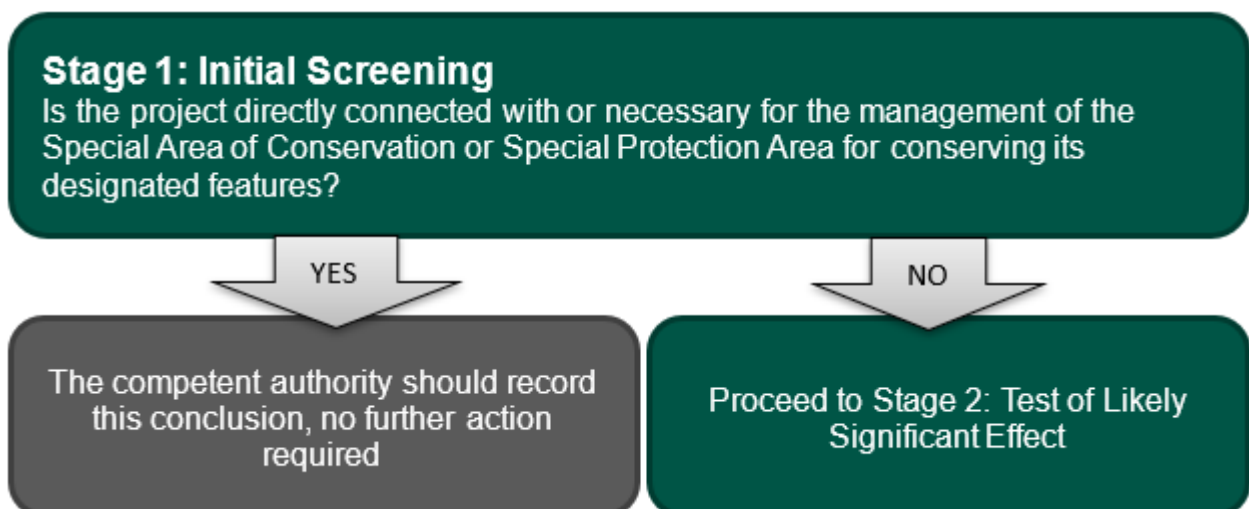
As, stated in section 1.3, in addition to the HRA, a WFD compliance assessment will be required, and similar evidence will be required to support both assessments. It is recommended that both assessments are undertaken in parallel. More information on how to carry out a WFD assessment is available here: [Natural Resources Wales / How to carry out a Water Framework Directive \(WFD\) assessment for a marine licence application](#).

2.1 Stage 1

Is the project directly connected with or necessary for the management of the Special Area of Conservation or Special Protection Area for conserving its designated features?

It is likely in most instances related to works to coastal structures, and having considered the screening steps in section 1, that the answer to this will be 'no'. This process is illustrated Figure 3.

Figure 3 Flow Chart to illustrate potential outcomes at Stage 1 of the HRA



2.2 Stage 2 – Test of Likely Significant Effect

Is the project likely to have a significant effect on the designated features of the Special Area of Conservation or Special Protection Area, either alone or in combination with other plans or projects (consult appropriate nature conservation body- this is NRW in Wales)?

There are four options for this step depending on the nature and location of the proposed works illustrated in Figure 4 and explained below.

Figure 4 Flow chart to explain the options under Stage 2 (Test of Likely Significant Effect) of the HRA



Option 1 – Proposed works are not considered likely to cause coastal squeeze

If screening step 1 indicates coastal squeeze will not occur, then regardless of whether or not the proposed works fall into the definition of maintenance in screening step 2, a conclusion can be reached at this stage that there is no pathway to effect for coastal squeeze and should be recorded by the competent authority. This conclusion can be reached regardless of SMP policy.

It should be noted that the HRA may still need to proceed to stage 3 for other reasons identified at stage 2 such as construction related impacts, access, disturbance, timing, use of machinery etc. Discussion of other impacts is outside the scope of this guidance note.

Option 2 - Proposed works could lead to coastal squeeze but are considered to be maintenance, and are in a ‘hold the line’ policy unit

If the answers to Screening Step 1 are all ‘yes’ (i.e., there is the potential for coastal squeeze to occur), but the proposed works are screened out as falling within the definition of maintenance at screening step 2, then this should be recorded at this stage of the HRA. However, in line with WG policy, which applies to works which are within ‘hold the line’ SMP policy units, no further action is required to assess coastal squeeze within the HRA.

For works that are in ‘managed realignment’ or ‘no active intervention’ policy units, see option 4 below.

It should be noted that the HRA may still need to proceed to stage 3 for other reasons identified at stage 2 such as construction related impacts, access, disturbance, timing, use of machinery etc. Discussion of other impacts is outside the scope of this guidance note.

Option 3 - Proposed works could lead to coastal squeeze, are not maintenance, and are in a ‘hold the line’ policy unit

If the answers to Screening Step 1 are all ‘yes’ (i.e., there is the potential for coastal squeeze to occur), the proposed works do not fall within the definition of maintenance (Screening Step 2) and are within a ‘Hold the Line’ policy unit in the SMP, then coastal squeeze will have been assessed as part of the HRA for the SMP.

As indicated in section 1.4.1 (Screening Step 1), it is recommended that the SMP HRAs are checked to see whether coastal squeeze impacts were identified (see section 5, Supporting Information and Annex 1). If they were, then this should be recorded at this stage of the HRA with a conclusion that likely significant effects have been identified due to the potential for coastal squeeze, and the HRA should proceed to stage 3 (Appropriate Assessment).

If no coastal squeeze impacts were identified in the SMP HRA then, subject to a brief review to ensure that the conclusions remain valid, no further action is required with

respect to coastal squeeze. As noted under Option 1, the HRA may still need to proceed to stage 3 for other reasons identified at stage 2.

Option 4 - Proposed works could lead to coastal squeeze, and are in a 'no active intervention' or 'managed realignment' policy unit

If the answers to Screening Step 1 (questions 1 - 4) are all 'yes' (i.e., there is the potential for coastal squeeze to occur) and are in 'no active intervention' or 'managed realignment' policy units in the SMP, then coastal squeeze will not have been assessed at the plan level. Furthermore, WG's policy applies to works which are consistent with the SMP policies, i.e., works to structures that are within 'hold the line' policy units, and therefore would not apply here.

The SMPs often provide further detail on specific management intent for individual policy units which complements the headline policy. For example, in a long policy unit identified as 'No active intervention' the description of the policy intent may state that there are short sections within the policy unit which are currently defended where ongoing investment could be made. Therefore, projects to invest in defences in those locations may still be in line with SMP policy, but the HRA of the SMP won't have considered the impacts of such works, because coastal squeeze impacts were only assessed in 'Hold the line' Policy units

In the first instance, it is recommended that the applicant considers whether a change of SMP policy is required. This should be considered in discussion with the relevant [Coastal Group](#). If the policy is changed to 'hold the line' then option 2 or 3 set out above would apply.

The applicant should also refer to the [Welsh National Marine Plan](#) policies SOC_08 and SOC_09 and paragraphs 121 to 125, which explain how regulators should consider compliance with SMP policies when taking decisions.

If the SMP policy remains unchanged, then coastal squeeze may occur, a conclusion of likely significant effect should be recorded at this stage, and the HRA should proceed to stage 3 (Appropriate Assessment).

2.3 Stage 3 – Appropriate Assessment

Carry out an appropriate assessment of the implications of the project in view of the site's conservation objectives, consult the relevant nature conservation body, and where necessary the public.

If proceeding to stage 3, it has already been determined that there is potential for coastal squeeze impacts to occur, leading to a conclusion at stage 2 that likely significant effects cannot be ruled out.

At Stage 3, more detailed consideration is needed of the potential scale, location and timing of those effects in relation to the site's features and conservation objectives. This is used to determine if the effect would be an adverse effect on the integrity of the protected site.

In the case of coastal squeeze, the primary impact would be on the extent of the features present. Conservation objectives associated with zonation of habitats and their distribution may also be affected and these potential effects should be noted where relevant but are likely to be difficult to quantify. Therefore, the quantified assessment of coastal squeeze impacts should primarily focus on habitat extent.

Section 4 of this Guidance Note provides further advice on how to carry out a coastal squeeze assessment, making use of the information already recorded in the SMP HRAs for 'hold the line' policy units. In the case of the Dee and Severn Estuaries, the coastal squeeze assessment information is taken from the respective Flood Risk Management Strategy (see Annex 1).

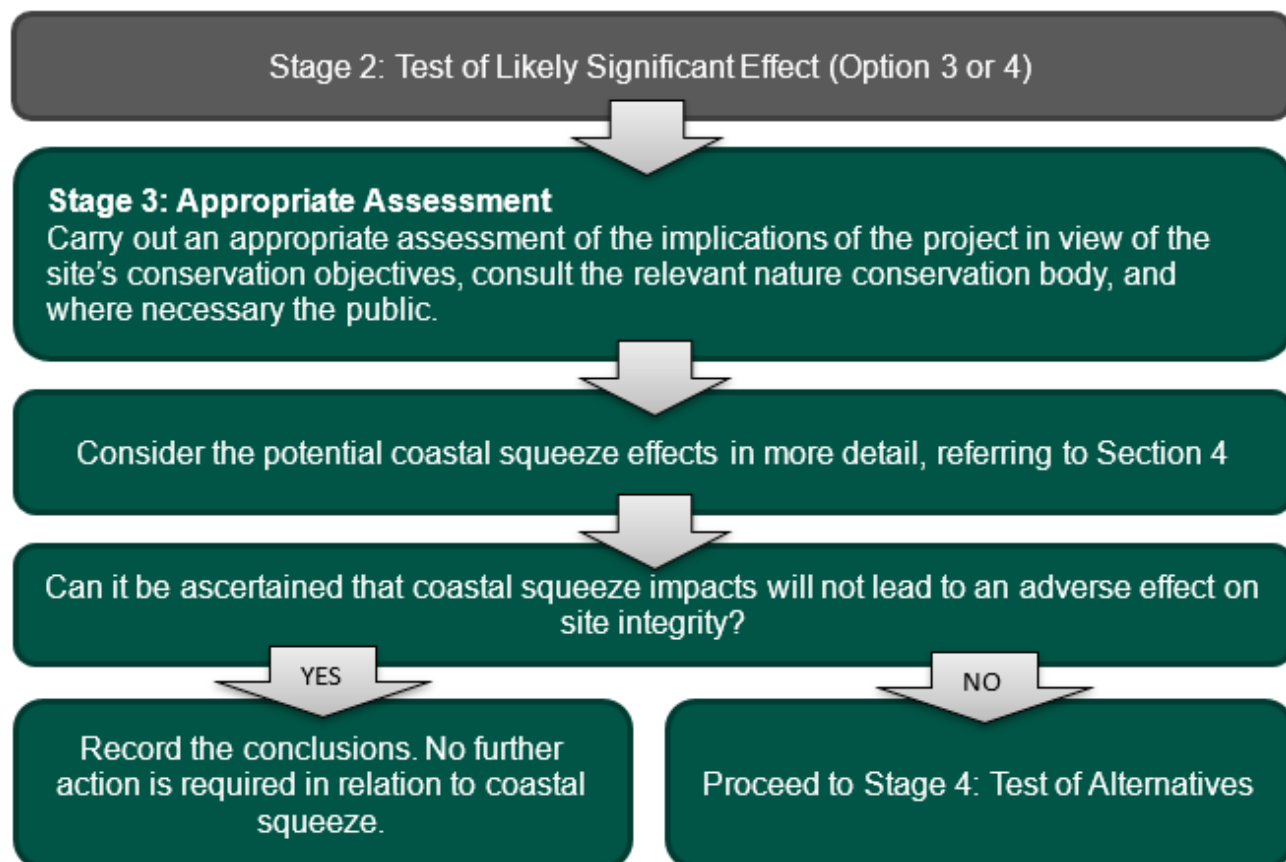
When the results of the coastal squeeze assessment are known, the competent authority, in consultation with the nature conservation body, then considers whether the predicted impacts would lead to a conclusion of adverse effects on site integrity. Any other impacts from the proposed project would also require consideration in reaching this conclusion.

If it can be ascertained that the project will not have an adverse effect on site integrity, then the project may be approved by the competent authority.

If it is concluded that the project may lead to an adverse effect, or if the result is uncertain, then it is possible to consider whether compliance with conditions or other restrictions would enable a conclusion of no adverse effect to be ascertained.

If suitable conditions or restrictions cannot be identified and the conclusion remains that adverse effects on site integrity cannot be ruled out, then a derogation from the Habitats Regulations is required - Stages 4 to 6. This process is illustrated in Figure 5

Figure 5 Flow chart to explain the considerations to be made under Stage 3 (Appropriate Assessment) of the HRA



2.4 Stage 4 – Alternative Solutions

Are there alternative solutions that would have a lesser effect, or avoid an adverse effect on the integrity of the site?

In reaching a conclusion on the preferred policy for a particular policy unit and epoch, SMPs considered the implication of alternative options informed by two assessment scenarios: 'no active intervention' and 'with present management'. The preferred policies were also subject to strategic environmental assessment to help determine the most appropriate policies for each unit and epoch. Therefore, the plan development process included consideration of alternative solutions at the policy (strategic) level. However, the plans did not consider alternative means of delivering the preferred policies e.g., *how* to implement hold the line, detailed design etc, and this was deferred to the project level.

There are two approaches to the test of alternative solutions depending on whether or not the proposed project is within a 'hold the line' policy unit. See options 1 and 2, and Figure 6 below.

Option 1 – the proposed project is within a ‘hold the line’ policy unit

If the proposed project is within a ‘hold the line’ policy unit, then the SMP can be used to support the consideration of alternative solutions in terms of policy. For example, it can show that alternative policies had been considered and tested, and that a conclusion had been reached that the ‘hold the line’ policy was preferred and could be justified.

This means more detailed consideration of alternative solutions at the project level can focus on whether there are alternative ways to deliver the ‘hold the line’ policy which would have a lesser effect or avoid adverse effect on site integrity. For example, consideration could be given to localised set back of the defence structure which would reduce the squeeze effect by creating space. If such measures are not possible whilst still delivering the project objectives, then it can be concluded that there are no alternative solutions.

Option 2 – the proposed project is within a ‘no active intervention’ or ‘managed realignment’ policy unit

In this instance, it is unlikely the SMP can be used to justify there are no alternative solutions at the policy level. This is because the SMP concluded that a policy of ‘hold the line’ was not preferred, and therefore does not support the proposed project to undertake works to a coastal structure.

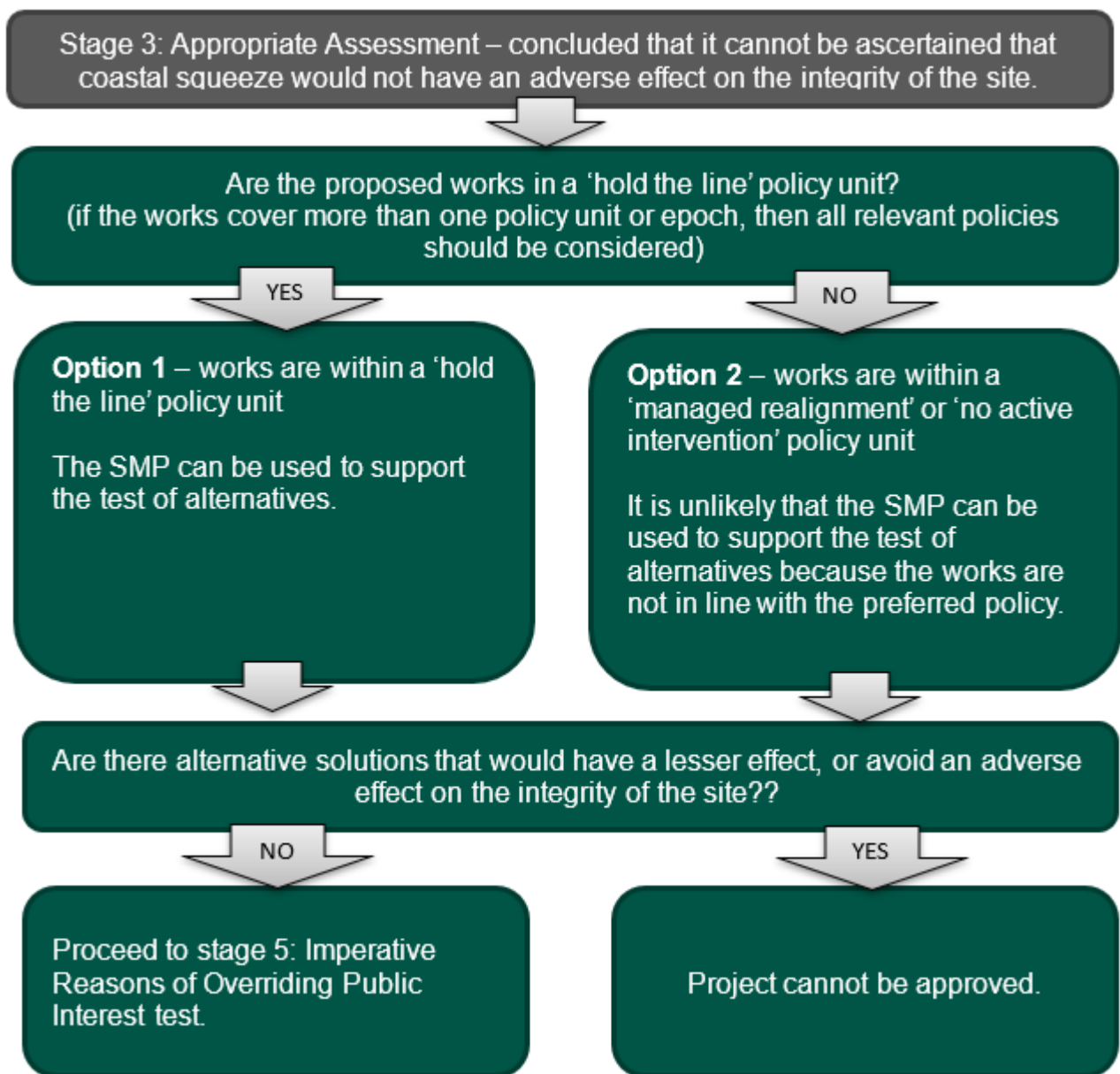
There may, however, be instances where the detail of the policy intent indicates that whilst the majority of a policy unit is ‘no active intervention’, coastal defence works in small discrete sections would not be precluded. It is therefore recommended that SMP policy intent and any relevant supporting information is reviewed to understand any additional detail which may support the test of alternatives.

In most cases, where works are proposed in a policy unit which is not ‘hold the line’, it is expected that significant effort will be required to justify a conclusion different to the one reached in the SMP, that there are no alternative solutions at the policy level. As with option 1, alternative solutions at the project level in terms of detailed design should also be considered.

If alternative solutions are available, the project should not be approved.

If there are no alternative solutions available, then the HRA proceeds to stage 5. This process is illustrated in Figure 6

Figure 6 Flow chart to explain the considerations to be made under Stage 4 (Test of Alternatives) of the HRA



2.5 Stage 5 - Imperative Reasons of Overriding Public Interest (IROPI)

Are there imperative reasons of overriding public interest of a social or economic nature sufficient to override the harm to the site?

Note: if a priority habitat or species is affected, then the reasons of overriding public interest must relate to human health, public safety, or benefits of primary importance to the environment.

In the event that no alternative solutions are feasible, a project may still go ahead if it can be demonstrated there are imperative reasons of overriding public interest. 'Overriding public interest' means that the public interest of carrying out the purpose of the project is considered to override the importance of maintaining the site features at that location.

If imperative reasons of overriding public interest can be demonstrated, and the competent authority is minded to approve the project, then they should inform Welsh Ministers and wait 21 days.

The project may be approved subject to Welsh Ministers securing that any necessary compensatory measures are taken to ensure the overall coherence of the National Site Network.

The SMP process included an economic assessment and a strategic environmental assessment which together considered whether there was sufficient social and/or economic justification for the 'hold the line' policies being proposed. 'Hold the line' policies were not put forward in locations where these justifications could not be made. Therefore, the SMP development process provided evidence to support the Imperative Reasons of Overriding Public Interest (IROPI) test in 'hold the line' policy units only. Figure 7 illustrates this process.

Option 1 – the proposed project is within a 'hold the line' policy unit

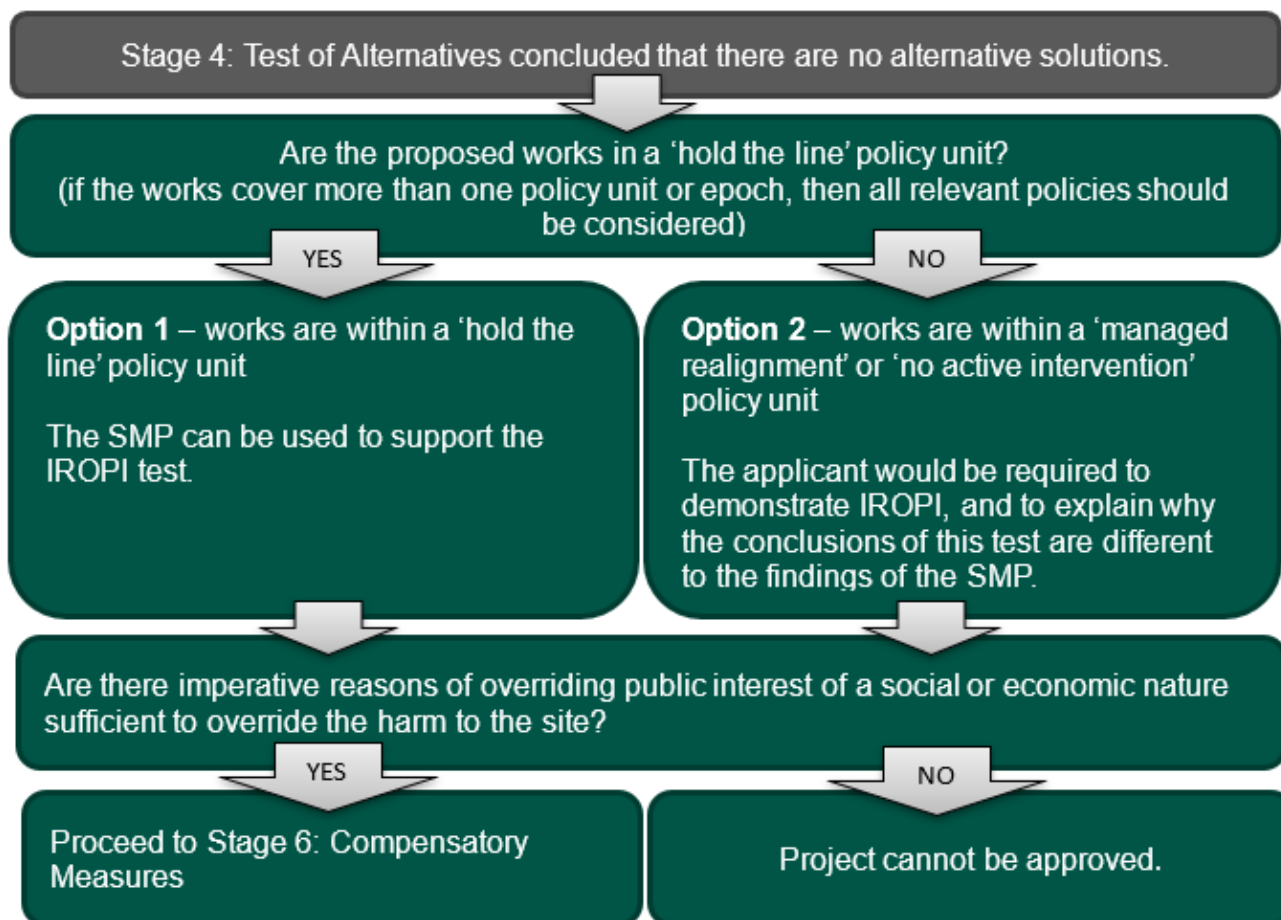
The SMP can be used to support this stage.

WG Policy clarification note paragraph 3.4 states: 'Provided that an individual project/plan is demonstrably consistent with the relevant Shoreline Management Plan policy, the statutory notice to WG from NRW shall include a short confirmation of the fact and therefore the plan/project is justified on grounds of no alternative solutions and the existing Shoreline Management Plan IROPI.'

Option 2 – the proposed project is within a 'no active intervention' or 'managed realignment' policy unit

The applicant would be required to provide sufficient information to demonstrate imperative reasons of overriding public interest, and to explain why the conclusions of this test are different to the findings of the SMP.

Figure 7 Flow chart to explain the considerations to be made under Stage 5 (Imperative Reasons of Overriding Public Interest Test) of the HRA



2.6 Stage 6: Compensatory Measures

The project may be approved subject to Welsh Ministers securing that any necessary compensatory measures are taken to ensure the overall coherence of the National Site Network.

WG have directed NRW to deliver compensatory measures for Flood and Coastal Erosion Risk Management projects through the National Habitat Creation Programme (NHCP). The role of NHCP is set out [WG's 2021 Policy Clarification Note: Use of the National Habitat Creation Programme in delivering Flood and Coastal Erosion Risk Management projects](#) and applies to Risk Management Authorities (Local Authorities and NRW) in Wales. NHCP should provide compensation for both coastal squeeze and footprint losses associated with projects. This process is illustrated in Figure 8.

The NHCP does not provide compensatory measures in relation to works to third party coastal assets, although it may be possible for a third party to work with the NHCP by exception. Exception criteria are listed in Annex 2. It may therefore be appropriate for third parties to consider development of their own independent strategic programme if they are likely to have larger scale requirements for compensatory measures associated with their

anticipated coastal plans and projects. Compensatory measures would need to be secured to enable Welsh Ministers to approve projects.

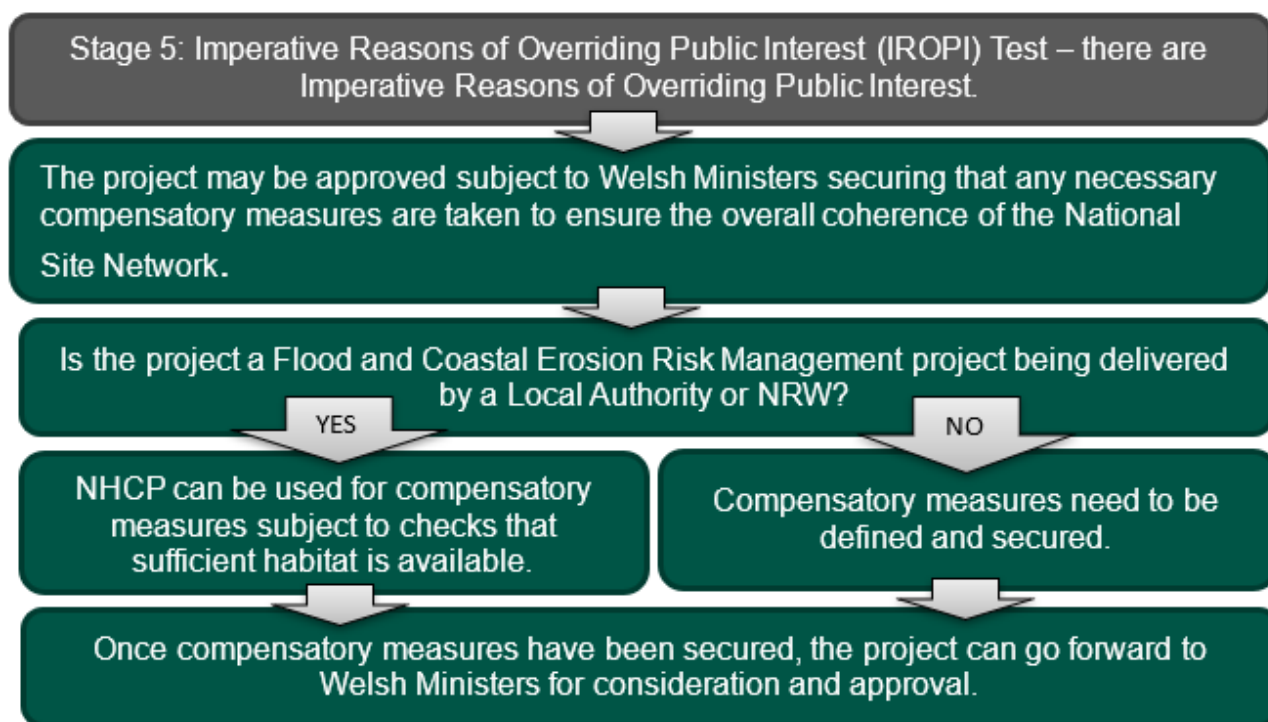
Under the NHCP, opportunities for habitat creation are assessed across Wales and schemes are being developed to provide timely offset of an appropriate scale to maintain the integrity of the National Site Network. In the longer-term, the scale of habitat creation will depend on the rate of sea level rise and the degree of habitat loss identified from the HRAs of plans and projects combined with evidence from monitoring of habitat loss, related to coastal squeeze.

The NHCP is a strategic compensatory delivery mechanism, which is intended to provide a streamlined and integrated approach to habitat creation, with better environmental outcomes than small-scale piecemeal delivery. It should reduce the burden of finding solutions to compensatory habitat requirements on a project-by-project basis and will enable habitat to be delivered in a phased way in response to sea-level rise rather than in advance of each individual project.

Use of NHCP for compensatory measures:

In order for a project to rely on the NHCP for compensatory measures, the Risk Management Authority should clarify the anticipated losses due to coastal squeeze (see section 2.3 and section 4) and ensure that the NHCP has sufficient habitat available to compensate for these losses. It should be noted that habitat creation projects can take several years to deliver and then develop into functioning habitat. Therefore, early notification of likely requirements to NHCP will help to ensure that sufficient habitat is available to enable projects to be approved, assuming all other tests are met.

Figure 8 Flow chart to explain the considerations to be made under Stage 6 (Compensatory Measures) of the HRA



3. Regulation and Permitting

Works to coastal structures may require a range of potential permits or licences, and these will need to be determined on a project specific basis. Early engagement with NRW is therefore encouraged to establish exactly what permits and environmental assessments are required and what they need to cover. It is likely, for example, that a WFD compliance assessment will be required in addition to the HRA.

Due consideration should also be given to other licences/permits and consents that may be required. It is the responsibility of the applicant to satisfy themselves they have obtained all relevant consents and authorisations. In addition, sufficient time should be allowed to work through the consenting process including Habitats Regulations derogation (IROPI) approval if required (see section 2, stage 5).

Note that compliance with plans and policies such as SMP policies and Welsh National Marine Plan Policies (see section 2.2, option 4) is a relevant consideration in the determination of consents.

Information on [NRW permits and permissions](#) can be found on NRW's website.

In relation to works to coastal structures, one or several of the following may be required:

- [Marine Licence](#)
- [Planning Permission \(Town and Country Planning\)](#)
- [Flood Risk Activity Permit](#)

- [SSSI consent or assent](#)
- [Coast Protection Act Consent](#)

4. Technical Assessment of Coastal Squeeze

This section provides further advice on how to carry out a coastal squeeze assessment, making use of the information already recorded in the SMP HRAs for 'hold the line' policy units. We advise the following key points to help inform the approach to the assessment:

- The coastal squeeze assessment should relate to the lifetime (residual life) of the proposed scheme and assets. It is likely in most instances that the residual life will extend beyond the lifetime of the SMPs (2105) and, depending on the scale of the predicted loss, figures can either be recalculated (see further advice below), extrapolated or the uncertainty/underestimate noted.
- An appropriate area of interest (section of coast or estuary) should be selected depending on the scale of the proposed scheme, its location, and the associated complexity in terms of coastal processes. For example, a large project in a complex estuary is likely to require consideration of a larger area of interest than a small project in a sheltered embayment. SMP policy units can provide a useful subdivision of the coast and may be an appropriate way to define the area of interest. Sometimes multiple policy units may need to be considered.
- The SMP HRA should be consulted first for schemes in 'hold the line' policy units to see if coastal squeeze was predicted at the plan level (see section 5 and Annex 1).
- If so, and the predicted coastal squeeze is very small for the relevant policy unit and lifetime of the scheme (e.g., less than 1 Ha), there may be limited benefit in carrying out a more detailed assessment, and the SMP figures could be used within Stage 3 (Appropriate Assessment) of the HRA.
- If the predicted coastal squeeze losses are large (e.g., more than 1 Ha) then additional assessment, referring to the [What is Coastal Squeeze?](#) Report should be considered, and would provide the opportunity to apply the updated sea-level rise guidance from WG: [Flood and coastal erosion risk management: adapting to climate change | GOV.WALES](#). This would also provide the opportunity to calculate losses up to the end of the residual life of the structure if this is beyond 2105 (the end of the third SMP epoch).
- The [Flood Map for Planning](#) shows the 1 in 1000 year flood extent with 100 years of predicted sea-level rise included and is therefore a useful indicator of future flooding risk. These will help to determine the extent of potential accommodation space for habitats to roll back, i.e., what would happen if the works to the coastal structure weren't undertaken, and the structure was allowed to degrade. In some instances, the available accommodation space will be less than the predicted losses due to coastal squeeze, and this needs to be considered within the assessment.
- The assessment must describe the effects in relation to Annex 1 coastal/intertidal features of designated sites within the National Site Network.

- A range of estimates should be provided which consider best to worst case scenarios, and a confidence assessment should also be assigned.

NRW recommends that anyone who needs to undertake a more detailed coastal squeeze assessment refers to the [What is Coastal Squeeze?](#) Report, which is discussed in more detail below. Of particular relevance are:

- Section 5 – which provides the definition of coastal squeeze (as set out in section 1 of this Guidance Note)
- Section 6 – Method for calculating coastal squeeze, especially section 6.3 which relates to predicting future effects.

The [What is Coastal Squeeze?](#) Report Section 6.3.4 (Predict future habitat losses) describes a range of potential tools/predictive models to inform the assessment of the potential scale of coastal squeeze. The tools which can be applied will vary in cost, complexity, and data requirements. The final step of the assessment (Section 6.3.6 Evaluation of causes of loss and the role of coastal squeeze) requires expert judgement to assess whether the observed/predicted changes represent coastal squeeze. Expert judgement is needed since there are multiple causes of changes in coastal habitat, and the physical expression of these changes can be similar. The method outlines how an assessment of confidence in the findings - 'high', 'medium' or 'low' - should be made. Where there is low confidence, two approaches can be taken:

- Adopt the precautionary principle, assume that habitat losses result from coastal squeeze, and review the assessment in the future.
- Carry out further studies to increase confidence in the findings.

At each step, the report explains what needs to be considered, potential sources of data, and sources of uncertainty in the assessment.

5. Supporting Information

5.1 Shoreline Management Plans

NRW's website contains information about [Shoreline Management Plans](#), and the plan documents can be found on the relevant Coastal Group websites as follows:

- [Severn Estuary](#)
- [South Wales \(Lavernock Point to St Ann's Head\)](#)
- [West of Wales \(St Ann's Head to Great Orme\)](#)
- [North Wales and North West England](#)

Annex 1 provides a summary table of Hold the Line Policy Units across all four SMPs where coastal squeeze was identified within the respective SMP HRA.

5.2 Maps and Data

- Information on flooding and coastal erosion risk can be found here [Flood Map for Planning \(naturalresources.wales\)](#) along with maps of Shoreline Management Plan Policy
- Information on designated sites can be found here: [Natural Resources Wales / Protected areas of land and seas](#)
- Various datasets including designated site and feature information, Shoreline Management Plan Policy layers, and LiDAR data can be downloaded from the Lle geoportal [Lle - Home \(gov.wales\)](#), which is in the process of being replaced by DataMapWales [Home | DataMapWales \(gov.wales\)](#).
- Coastal monitoring data is available from the [Wales Coastal Monitoring Centre | WCMC](#)
- Refer to the [What is Coastal Squeeze?](#) Report for other recommended sources of data.

Annex 1: Summary tables of Shoreline Management Plan ‘hold the line’ policy units where coastal squeeze was identified as a potential impact within the HRA

Predicted coastal squeeze losses associated with ‘hold the line’ policy units in SMPs are set out below for the four plans which cover the Welsh coast. The approach to the assessment for each SMP is described in each case.

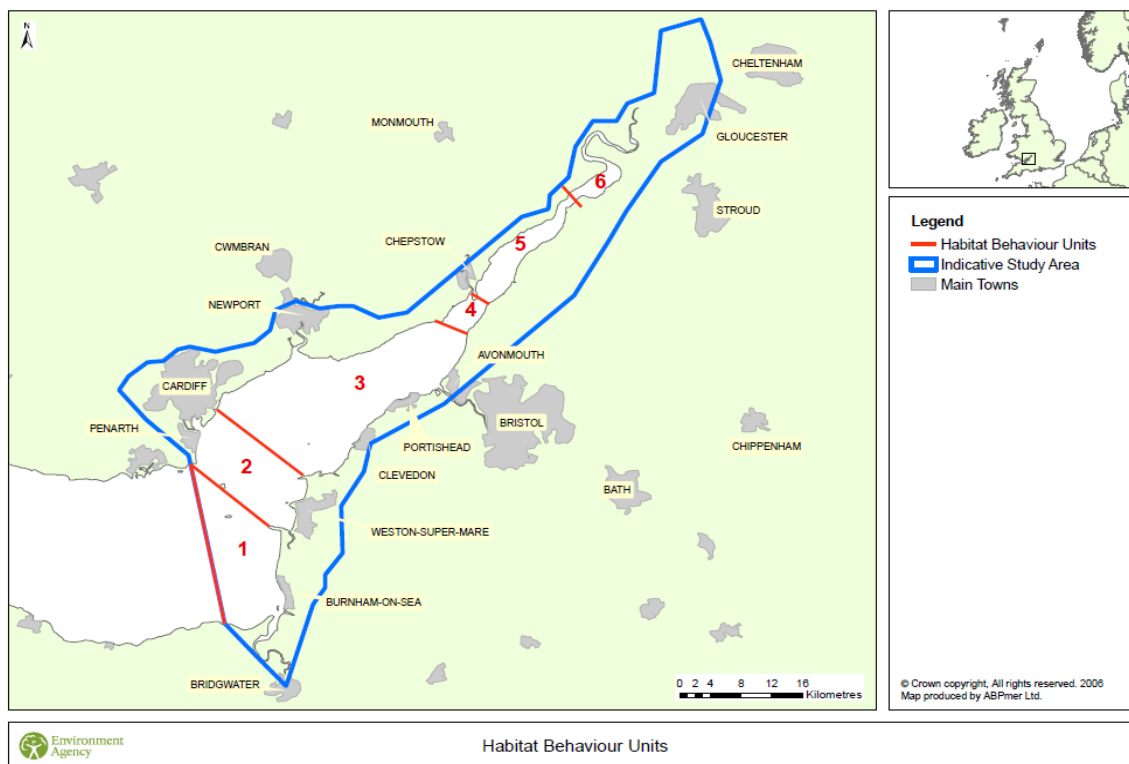
1. Severn Estuary Shoreline Management Plan

The information presented below is drawn from work originally undertaken for the Severn Estuary Coastal Habitat Management Plan (CHaMP), which informed the SMP HRA, and was subsequently refined to inform the Severn Estuary Flood Risk Management Strategy HRA.

The work involved an extensive literature review and development of a conceptual understanding of the estuary processes and its morphological evolution as well as a comprehensive habitat inventory. The use of various morphological assessment tools and analytical techniques were applied to determine future morphological behaviour over timescales of 20, 50 and 100 years. This resulted in a habitat gain/loss account.

The predicted habitat losses were estimated for six Habitat Behaviour Units shown in the map (Figure 9) below.

Figure 9 Map of Severn Estuary Habitat Behaviour Units (taken from the Severn Estuary CHaMP)



Initially, within the Severn Estuary CHaMP, extensive losses were predicted, and these were included in the SMP HRA/IROPI case. However, on further refinement (via work on the Flood Risk Management Strategy), it was agreed that only some of the predicted intertidal losses are likely to be caused by flood and coastal erosion management structures/activities.

These refined results are summarised for each Habitat Behavioural Unit in Table 1, with negative figures indicating a habitat loss:

Table 1: Predicted Habitat Losses for Habitat Behaviour Units in the Severn Estuary, taken from the Severn Estuary Flood Risk Management Strategy

Habitat Behaviour Unit	Short term (Ha)	Medium term (Ha)	Long term (Ha)	Total (Ha)
1	63	-66	-253	-256
2	1	-14	-40	-53
3	-440	-797	-1126	-2363
4	-4	-9	-156	-169
5	-136	-19	-206	-361
6	29	90	201	320
Total (Ha)	-497	-815	-1580	-2892

NRW has undertaken further work to apportion the predicted losses according to asset length within each policy unit. Table 2 below sets out the split between England and Wales for each Habitat Behaviour Unit. Table 3 then set out the figures for each policy unit.

Table 2 Predicted habitat loss split between England and Wales for each Habitat Behaviour Unit

Habitat Behaviour Unit	Wales Epoch 1 (Ha)	England Epoch 1 (Ha)	Wales Epoch 2 (Ha)	England Epoch 2 (Ha)	Wales Epoch 3 (Ha)	England Epoch 3 (Ha)
1	0	63	0	-66	0	-253
2	0.1	0.9	-1.2	-12.8	-3.5	-36.5
3	-236	-204	-427	-370	-604	-522
4	-1.5	-2.5	-3.3	-5.7	-57	-99

Table 3 Predicted habitat loss estimates for each policy unit relevant to Wales

Habitat Behaviour Unit	Policy Unit	Total asset length with PU (m)	Coastal Squeeze Epoch 1 (ha)	Coastal Squeeze Epoch 2 (ha)	Coastal Squeeze Epoch 3 (ha)
2	PEN2	436.8m	0.03	-0.4	-1.0
2	CAR1	1035.5m	0.06	-0.9	-2.5
3	CAR2	620.0	-4.4	-7.9	-11.2
3	CAR3	592.1	-6.7	-12.2	-17.2
3	WEN1	2695.4	-19.1	-34.5	-48.8
3	WEN2	9627.3	-68.0	-123.3	-174.1
3	CALD1	19481.6	-137.7	-249.4	-352.4
4	CALD3	4864.0	-1.5	-3.3	-57.4

2. South Wales Shoreline Management Plan (Lavernock Point to St Ann's Head)

For the South Wales SMP, four assessments of potential coastal squeeze habitat loss were undertaken using the following sea-level rise scenarios: UKCP09 Low, UKCP09 Central, UKCP09 High, and Defra 2006. Table 4 shows the lowest estimate (derived from UKCP09 Low in all cases) and highest estimate (derived from either UKCP09 high or Defra 2006) for each epoch. Habitat type affected was not recorded alongside the figures presented.

Table 4 Table 4 Predicted habitat loss figures for the South Wales SMP, showing the lowest estimate (derived from UKCP09 Low in all cases) and highest estimate (derived from either UKCP09 high or Defra 2006) for each epoch.

Policy Unit	Habitat Loss (Ha) Epoch 1	Habitat Loss (Ha) Epoch 2	Habitat Loss (Ha) Epoch 3	Designated Site
12.1	1.3 – 5.0	3.6 - 13.4	8.5 – 37.5	Carmarthen Bay and Estuaries SAC; Burry Inlet SPA; Burry Inlet Ramsar
12.2	8.9 – 18.2	24.6 – 50.5	57.6 – 118.0	Carmarthen Bay and Estuaries SAC; Burry Inlet SPA; Burry Inlet Ramsar
12.6	7.0 – 8.0	18.4 – 22.5	52.5 – 52.5	Carmarthen Bay and Estuaries SAC; Burry Inlet SPA; Burry Inlet Ramsar
12.7	0.3 – 1.1	0.8 – 2.8	1.8 – 8.0	Carmarthen Bay and Estuaries SAC; Burry Inlet SPA; Burry Inlet Ramsar
12.8	3.1 – 11.9	8.7 – 32.1	20.3 – 90.0	Carmarthen Bay and Estuaries SAC; Burry Inlet SPA; Burry Inlet Ramsar
12.10	2.9 – 3.8	8.1 – 10.7	19.0 – 25.0	Carmarthen Bay and Estuaries SAC; Burry Inlet SPA; Burry Inlet Ramsar

Policy Unit	Habitat Loss (Ha) Epoch 1	Habitat Loss (Ha) Epoch 2	Habitat Loss (Ha) Epoch 3	Designated Site
14.2	5.2 – 19.9	14.5 – 53.6	33.9 – 150.0	Carmarthen Bay and Estuaries SAC; Burry Inlet SPA; Burry Inlet Ramsar
14.3	3.5 – 13.3	9.7 – 35.7	22.6 – 100.0	Carmarthen Bay and Estuaries SAC; Burry Inlet SPA; Burry Inlet Ramsar
14.9	1.3 – 5.0	3.6 – 13.4	8.5 – 37.5	Carmarthen Bay and Estuaries SAC; Burry Inlet SPA; Burry Inlet Ramsar
14.19	0.8 – 3.1	2.2 – 8.3	5.2 – 23.2	Carmarthen Bay and Estuaries SAC; Burry Inlet SPA; Burry Inlet Ramsar
16.4	0.0 - 0.0	0.0 – 0.0	0.0 – 0.1	Carmarthen Bay and Estuaries SAC; Burry Inlet SPA; Burry Inlet Ramsar
20.6	0.0 - 0.0	0.0 – 0.0	0.0 – 0.1	Pembrokeshire Marine SAC
21.2	0.2 – 0.7	0.5 – 1.7	1.1 – 5.0	Pembrokeshire Marine SAC
21.3	0.2 – 0.6	0.4 – 1.6	1.0 – 4.4	Pembrokeshire Marine SAC

3. West of Wales Shoreline Management Plan (St Ann's Head to Great Orme)

In Table 5 below, estimates of coastal squeeze habitat losses are provided, including an indication of habitat type affected. Cells containing "Null" indicate a change in policy from 'hold the line' to 'managed realignment', or 'no active intervention'.

Table 5 Predicted habitat loss figures for the West of Wales SMP. Cells containing "Null" indicate a change in policy from 'hold the line' to 'managed realignment', or 'no active intervention'

Policy Unit	Habitat Loss (Ha) Epoch 1	Habitat Loss (Ha) Epoch 2	Habitat Loss (Ha) Epoch 3	Habitat Type	Designated Site
2.2	0.23	0.02	Null	Mudflats and Sandflats	Pembrokeshire Marine SAC
2.4	0.01	0.60	Null	Mudflats and Sandflats	Pembrokeshire Marine SAC
2.5	0.12	Null	Null	Mudflats and Sandflats	Pembrokeshire Marine SAC
2.6	0.08	0.37	Null	Mudflats and Sandflats	Pembrokeshire Marine SAC
2.8	0.32	Null	Null	Mudflats and Sandflats	Pembrokeshire Marine SAC
3.2	0.17	0.03	Null	Mudflats and Sandflats	Pembrokeshire Marine SAC
3.3	0.08	0.38	0.08	Mudflats and Sandflats	Pembrokeshire Marine SAC
3.4	0.01	Null	Null	Mudflats and Sandflats	Pembrokeshire Marine SAC
3.5	0.01	0.04	0.03	Mudflats and Sandflats	Pembrokeshire Marine SAC
3.8	0.02	Null	Null	Mudflats and Sandflats	Pembrokeshire Marine SAC

Policy Unit	Habitat Loss (Ha) Epoch 1	Habitat Loss (Ha) Epoch 2	Habitat Loss (Ha) Epoch 3	Habitat Type	Designated Site
10.3	0.47	Null	Null	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC and Dyfi Estuary SPA
10.6	2.30	150.2	Null	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC and Dyfi Estuary SPA
10.6	1.84	120.16	Null	Atlantic Saltmeadow	Pen Llyn a'r Sarnau SAC and Dyfi Estuary SPA
10.7	0.87	13.09	Null	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC and Dyfi Estuary SPA
10.8	0.00	0.35	0.00	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC and Dyfi Estuary SPA
10.9	1.65	Null	Null	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC and Dyfi Estuary SPA
10.11	1.13	8.23	25.27	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC and Dyfi Estuary SPA
10.12	0.00	3.19	1.92	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC and Dyfi Estuary SPA
10.13	0.00	0.72	0.51	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC and Dyfi Estuary SPA
10.17	0.29	6.39	1.59	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC and Dyfi Estuary SPA

Policy Unit	Habitat Loss (Ha) Epoch 1	Habitat Loss (Ha) Epoch 2	Habitat Loss (Ha) Epoch 3	Habitat Type	Designated Site
10.18	0.00	Null	Null	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC and Dyfi Estuary SPA
11.1	0.43	6.82	1.46	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
11.3	0.24	0.90	0.11	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
11.4	0.15	Null	Null	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
11.6	1.16	Null	Null	Atlantic Saltmeadow	Pen Llyn a'r Sarnau SAC
11.7	0.00	2.42	2.51	Atlantic Saltmeadow	Pen Llyn a'r Sarnau SAC
11.8	1.20	7.77	12.93	Atlantic Saltmeadow	Pen Llyn a'r Sarnau SAC
11.9	1.90	Null	Null	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
11.11	0.00	0.00	0.02	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
12.2	0.00	Null	Null	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
12.3	0.00	Null	Null	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
12.4	0.00	4.38	2.93	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
12.6	0.00	2.11	1.83	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC

Policy Unit	Habitat Loss (Ha) Epoch 1	Habitat Loss (Ha) Epoch 2	Habitat Loss (Ha) Epoch 3	Habitat Type	Designated Site
12.8	0.03	2.82	3.71	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
12.8	0.03	2.54	3.34	Atlantic Saltmeadow	Pen Llyn a'r Sarnau SAC
12.9	0.20	Null	Null	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
12.9	0.18	Null	Null	Atlantic Saltmeadow	Pen Llyn a'r Sarnau SAC
12.13	0.00	6.01	18.00	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
12.13	0.00	3.00	9.00	Atlantic Saltmeadow	Pen Llyn a'r Sarnau SAC
12.14	0.00	0.30	1.56	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
12.14	0.00	0.01	0.08	Atlantic Saltmeadow	Pen Llyn a'r Sarnau SAC
12.17	0.00	Null	Null	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
12.18	0.00	0.30	Null	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
12.20	0.00	0.82	0.12	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
12.24	0.00	Null	Null	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
13.6	0.00	1.19	0.80	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC

Policy Unit	Habitat Loss (Ha) Epoch 1	Habitat Loss (Ha) Epoch 2	Habitat Loss (Ha) Epoch 3	Habitat Type	Designated Site
13.7	0.00	Null	Null	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
13.8	0.00	Null	Null	Mudflats and Sandflats	Pen Llyn a'r Sarnau SAC
16.5	0.65	Null	Null	Mudflats and Sandflats	Menai Strait and Conwy Bay SAC
16.9	0.17	3.30	3.65	Mudflats and Sandflats	Anglesey Coast Saltmarsh SAC
16.11	0.53	3.47	Null	Mudflats and Sandflats	Menai Strait and Conwy Bay SAC
16.33	0.03	0.4	Null	Mudflats and Sandflats	Menai Strait and Conwy Bay SAC
20.1	0.00	0.03	0.01	Mudflats and Sandflats	Menai Strait and Conwy Bay SAC

4. North Wales and North West England Shoreline Management Plan

Policy Unit level calculations of coastal squeeze were not undertaken for the North Wales and North West England SMP, but the HRA was informed by work undertaken concurrently on the Dee Estuary Flood Risk Management Strategy. It concluded that coastal squeeze is not predicted to impact the estuarine features of the Dee Estuary SAC, SPA, or Ramsar in the short-term (0-20 years). However, there is increasing uncertainty that a positive sediment regime will be maintained, so the possibility of potential losses is likely to increase through the second epoch and becomes likely by some point in the third epoch.

The precautionary, 'worst case' prediction for the maximum area of intertidal habitat that could be adversely affected as a result of implementing a 'Hold the line' policy approach to flood defence around the **entire** estuary is 140ha at Year 50, increasing to a total of 594ha at Year 100. However, it should be noted that hold the line is not the preferred policy for the whole estuary within the SMP.

For the Welsh shore of the Dee Estuary, potential adverse effects due to coastal squeeze were noted in Policy Units 5.1, 5.2 and 5.3.

Annex 2: Approach to engaging with the National Habitat Creation Programme for Third Parties

The National Habitat Creation Programme (NHCP) is a WG Programme managed by NRW. The purpose of the NHCP is to provide compensatory measures to address predicted impacts due to coastal squeeze (and footprint losses) associated with Flood and Coastal Erosion Risk Management projects delivered by Risk Management Authorities (Local Authorities and NRW). The NHCP identifies opportunities to deliver compensatory habitat to secure the coherence of the National Site Network. Whilst the NHCP is intended to provide compensatory measures for Risk Management Authorities only, there are a number of exceptions when a third party may benefit from working with and investing in an NHCP project. These are set out below.

Rules for justifying 3rd party engagement with the National Habitat Creation Programme (NHCP)

In January 2019 a series of criteria were agreed with WG that describe the exceptional circumstances which might allow for a third party to work in partnership with the NHCP to deliver compensatory habitat. This would potentially support a third party's ability to demonstrate provision of appropriate compensatory habitat for coastal plans and projects which could be presented within an IROPI Statement of Case.

1. Working with a particular third party is helpful in supporting NHCP strategic objectives.
2. Habitat Compensation banking comprises/and or includes land offered by third party as part of compensation banking terms (otherwise not available to NHCP for managed realignment).
3. Working with a particular third party optimises opportunities for managed realignment that otherwise may not be feasible without the third-party investment and compensation banking, for example due to their asset lying within the area of interest (e.g., Network Rail).
4. Working with a particular third party supports an IROPI case related to a third party with a high level of public interest/scrutiny.
5. Working with a particular third party provides synergy/is complementary to the proposal in supporting other (non- National Site Network related) economic, social or environmental objectives aligned with WG and NRW priorities.
6. Working with a particular third party supports a Marine Licence applicant (and IROPI case) that already has an exceptionally well-defined compensatory proposition.
7. Working with a particular third party supports a Marine Licence (IROPI) applicant that has demonstrated an exceptional level of commitment to making the compensation work/be sustainable in the long term.

8. Working with a particular third party supports a Marine Licence (IROPI) applicant because of the exceptional technical challenges/impossibility of the applicant delivering a large-scale compensation requirement other than through NHCP.
9. Working with a particular third party supports their Marine Licence (IROPI) applicant based on integrity/type (i.e., strategic commitment with financial backing or an opportunist).
10. Working with a particular third party supports a Marine Licence (IROPI) applicant that is willing and able to offer a significant commuted sum for pro-rata banking of compensatory measures (support a business case that may otherwise not be approved due to cost).
11. Working with a particular third party supports a Marine Licence (IROPI) applicant, and the Minister is prepared to agree to the exception.
12. A combination of the above. These represent scenarios the WG would regard as an 'exception'

Notably it is not the purpose of these exception rules to enable a guaranteed approach to long term provision of third-party compensatory needs, but rather an opportunity through invitation by NRW on a project-by-project basis.