



# **Barmouth Sand Management Water Framework Directive Assessment**

CPF8200



## Document Control Sheet

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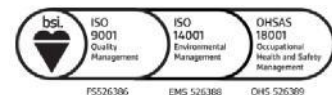
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### Distribution

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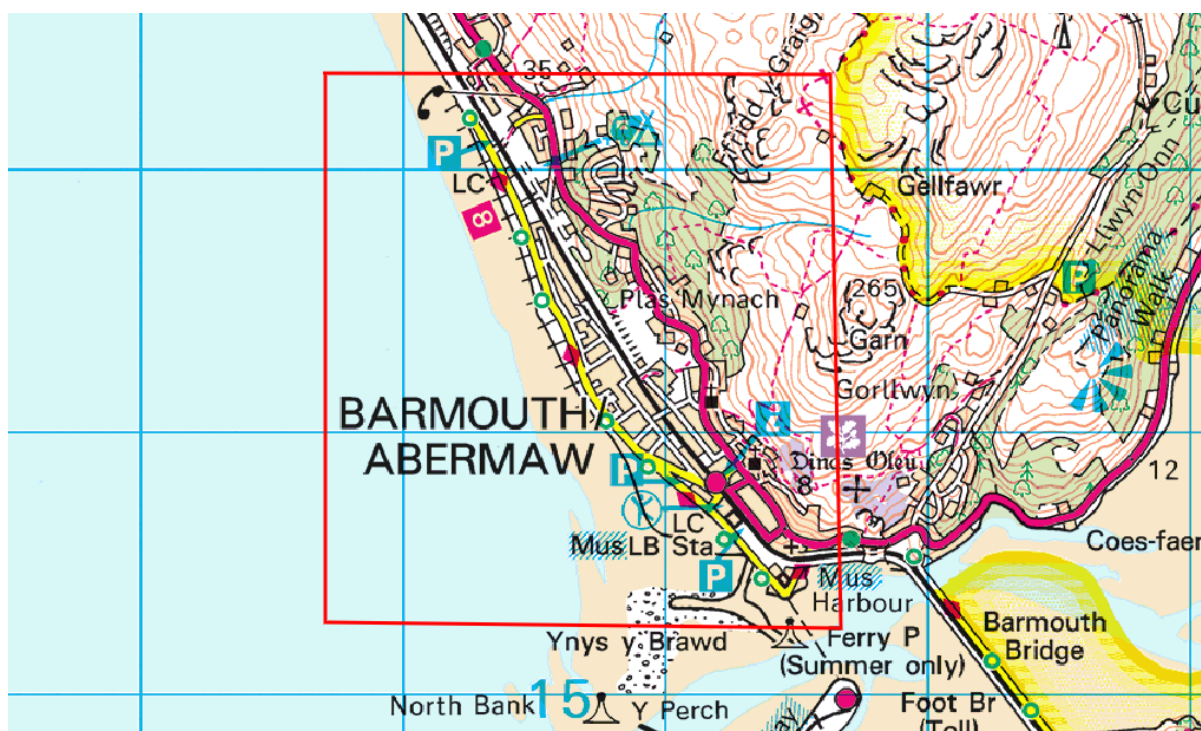


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## Background

YGC have been commissioned to carry out Environmental Assessments, including a Water Framework Directive Assessment, in support of a Marine Licence application, for proposed works to manage wind blown sand along the foreshore of Barmouth, Gwynedd. The proposed works are located at the beach and promenade area of Barmouth (NGR: SH 61238 15619), located on the northern shore of the mouth of the Mawddach Estuary.



## Introduction

Barmouth (Abermaw), Gwynedd, is located on the northern shore of the mouth of the Mawddach Estuary. There is an ongoing issue with wind-blown sand along the promenade towards the southern end of the town. Historically, Gwynedd Council have been managing the build up of sand in front of the sea wall by removing the sand from this area and depositing it further down the beach (see Appendix A). In previous years this has involved transporting the sand northwards and depositing the sand on the foreshore at the northern extent of the promenade (see Appendix A). This had the benefit of contributing material to an area where beach levels have dropped significantly over the years.

More recently, as the wind blown sand has become more of a prominent issue, with increase in the level of the main beach at the southern extent of the prom, the sand has been deposited near the dune system rather than at the north end of the prom. This has allowed more sand to be moved due to reduced transportation cost. An options report into the management of wind blown sand has been produced (KPAL, 2022), and this has suggested encouraging further growth of the dune system adjacent to the causeway through deposition of sand collected from the area in front of the sea wall. This will be supplemented with additional measures including installation of chesnut fencing to trap mobile sand.

Sand blown over the sea wall also collects along the prom, the highway and the car parks in this area (Appendix A, figure 1). This has historically been collected as required, and deposited on the foreshore at the northern end of the promenade. It is proposed that this practice will continue.

Barmouth experiences a mean spring tidal range of approximately 4.3 m, and a wide intertidal zone is exposed at low tide, especially along the southern part of the frontage. During storm surges predicted high water levels may be increased by up to 1 m and the upper beach is typically covered by storm tides on a small number of occasions each winter. However, for much of the year a wide area of the upper beach is unaffected by tides and is exposed to wind action. Sand can be moved by winds from any direction, but incursion onto the southern part of the promenade, road and car park is most frequently associated with strong winds from the northwest and west.

The dominant net sediment drift direction in the nearshore zone within Barmouth bay is from south to north, but in the intertidal zone there is a sediment drift divide just to the north of Barmouth which give rise to net southerly sediment drift along Barmouth Beach (KPAL, 2016). The northern part of Barmouth Beach has experienced net sediment loss and falling levels for decades, whereas the southern part of the beach (between the Min y Mor Hotel and Barmouth Harbour) has been experiencing sediment accretion and rising beach levels (KPAL, 2016). Refer to Appendix B which provides information on the coastal processes.

Removal of sand to take place using excavator and dumper to transport / deposit. The deposition of sand onto the sand dune area will require vehicle access onto the beach. Access on to the foreshore will be via designated slipways. Sand will be transported to the North Prom disposal site via the road and then an excavator will be used to lower the sand onto the beach from the prom above. Therefore no vehicle access onto the beach itself will be required in this area.

#### Summary of proposals:

- Programme to move accumulated sand from the area directly in front of the promenade sea wall twice a year, in the autumn/early winter and again at the end of winter. The aim will be to create a hollow in front of the sea wall to the same depth every time.
- Any additional sand that blows over is to be collected from the promenade, the road and the car park at the rear when the levels are sufficient to create access or safety issues to the users of these areas.
- Sand collected from the sea wall to be moved to the dune area as recommended in the KPAL report. This will take place whilst there is capacity within the identified receptor site within the dunes (estimated 1 or 2 years). Once the dune receptor site is deemed at capacity, sand from sea wall will be transported to the deposit area at the north end of the beach.
- Sand collected from the promenade, road, car park area (Appendix A, figure 2) to be moved to the designated deposit area at the north end of the beach (Appendix A, figure 3).
- Additional fencing to be placed on the beach next to the dune system, in line with recommendations outlined in the KPAL report.
- Continued monitoring of beach levels and wind data to analyse and contextualise the success of the above measures.

Works are expected to commence in winter 2023/24 and continue for a period of 5 years, when a full review and new application for Marine Licence will be made.

The proposal is subject to a Marine Licence by Natural Resource Wales, and must also follow the guidelines set out by the WFD legislation and not cause negative effects to the water environment,

water quality, ecosystems or biodiversity. This report therefore highlights any impacts the work could potentially have on the waterbody, along with mitigation and an assessment (if required) of whether the proposals comply with the Water Framework Directive.

### ***Legislative Background***

The Water Framework Directive (WFD) is a European Directive which sets out a strategic planning process for the purposes of managing, protecting and improving the water environment. The WFD introduces new environmental requirements which aim to meet good status in all water bodies. For surface waters, good status is made up of 'good ecological status (GES)' (or good ecological potential (GEP) where artificial or heavily modified) and 'good chemical status'. Ecological status and potential are made up of a number of biological, hydromorphological and physio-chemical quality elements. Chemical status is recorded as either good or failing. For groundwater to be in overall 'good' status, both quantitative and chemical status must be 'good'. The WFD also requires prevention of deterioration in water body status including deterioration of any of the individual quality elements.

The main objectives of the WFD are to:

- Prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters;
- Aim to achieve at least 'Good Status' for all waters by 2015 (2021 or 2027 where fully justified within an extended deadline under Article 4.4);
- Promote sustainable use of water;
- Conserve habitats and species that depend directly on water;
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment;
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- Help reduce the effects of floods and droughts.

New activities and schemes that affect the water environment may adversely impact biological, hydromorphological, physico-chemical and/or chemical quality elements (WFD quality elements), leading to deterioration in water body status. They may also render proposed improvement measures ineffective, leading to the water body failing to meet its WFD objectives for GES/GEP. Under the WFD, activities must not cause deterioration in water body status or prevent a water body from meeting GES/GEP by invalidating improvement measures.

## WFD Assessment in Stages

The Water Framework Directive Assessment can have up to three stages, which are

- **Screening Stage:** excludes any activities that do not need to go through the scoping or impact assessment stages
- **Scoping Stage:** identifies the receptors that are potentially at risk from your activity and need impact assessment
- **Impact Assessment Stage:** considers the potential impacts of your activity, identifies ways to avoid or minimise impacts, and shows if your activity may cause deterioration or jeopardise the water body achieving good status

## The Proposal

Your activity	Description, notes or more information
Name of activity	Barmouth Sand Management
Brief description of activity	Removal of wind blown sand from the beach wall, promenade, road and car park area adjacent to the southern end of Barmouth Beach. Sand to be placed at the dune area at the southern end of the Beach and also at the northern end of Barmouth Beach (See Appendix 1)
Location of activity (central point XY coordinates or national grid reference)	<u>Scheme location:</u>  Sand Collection Area – SH61250 15638 Dune deposit site – SH 61236 15456 North Prom deposit site – SH 60286 17147
Footprint of activity (ha)	<i>Approx. 0.5ha</i>
Timings of activity (including start and finish dates)	Start date: Winter 2023/24 End date: Ongoing (Marine Licence application of 5 years)

Extent of activity (for example size, scale frequency, expected volumes of output or discharge)	<p>Wind blown sand is to be collected from in front of the sea wall, the road and promenade area, and the car park, adjacent to the southern end of the beach at Barmouth. This will be an ongoing activity, expected to take place twice a year, in the early autumn and again at the end of winter. Sand blown on to the road, promenade and car park may need to be collected at more frequent intervals should access or safety issues arise due to the accumulation of windblown sand in these areas.</p> <p>A receptor site within the dune area at the south end of the beach will be used to deposit sand collected from the sea wall. Sand collected from the prom, road and car park is to be moved to the identified deposit area at the north end of the beach.</p> <p>The exact volume of wind blown sand to be moved is difficult to predict, however it is estimated that approximately 1200m<sup>3</sup> will be moved at each stage.</p>
Use or release of chemicals (state which ones)	<i>None</i>



## WFD Assessment

### WFD Classification

The WFD classification for a defined water body is produced by assessment of a wide variety of different 'elements' which includes:

- 'biological elements' such as fish, invertebrates, phytobenthos (which includes plants, macro-algae and phytoplankton);
- 'supporting elements' that include chemical measurements such as ammonia, dissolved oxygen, pH, phosphate, copper, zinc and temperature; and
- 'supporting conditions' (sometimes referred to as hydromorphology), that assess the physical attributes of the water body such as 'quantity and dynamics of flow' and 'morphology'.

The assessment given for each element is also accompanied by a measure of certainty in the result. The status classification is published in the River Basin Management Plan (RBMP)<sup>1</sup> and provides a baseline condition against which compliance and future improvements can be measured.

The activity / proposal involves the Mawddach transitional waterbody and the Cardigan Bay North coastal waterbody. A summary of key elements is provided below.

Water body <sup>1</sup>	Description, notes or more information
WFD water body name	<i>Mawddach</i>
Water body ID	<i>GB511006407100</i>
River basin district name	<i>Western Wales River Basin</i>
Water body type (estuarine or coastal)	<i>Transitional</i>
Water body total area (ha)	<i>9.51km<sup>2</sup> which equals 951ha</i>
Overall water body status (2018)	<i>Moderate</i>
Ecological status	<i>Good</i>
Chemical status	<i>Moderate</i>
Target water body status and deadline	<i>Not Designated</i>
Hydromorphology status of water body	<i>Not Designated</i>
Heavily modified water body and for what use	<i>No</i>
Higher sensitivity habitats present	<i>Not within the scheme footprint</i>

<sup>1</sup> <https://www.gov.uk/government/collections/river-basin-management-plans-2015#north-west-river-basin-district-rbmp-2015>

Lower sensitivity habitats present	<i>Intertidal soft sediment (mudflats and sandflats), gravel and cobbles (intertidal and subtidal coarse sediment), subtidal soft sediment (sand, mud and mixed),</i>
Phytoplankton status	<i>Not specified</i>
History of harmful algae	<i>Not specified</i>
WFD protected areas within 2km	<i>Pen Llyn a'r Sarnau SAC, Meirionnydd Oakwoods and Bat Sites SAC, Abermawddach SSSI (also part of Pen Llyn a'r Sarnau SAC).</i>

Water body <sup>1</sup>	Description, notes or more information
WFD water body name	<i>Cardigan Bay North</i>
Water body ID	<i>GB621009600000</i>
River basin district name	<i>Western Wales River Basin</i>
Water body type (estuarine or coastal)	<i>Coastal</i>
Water body total area (ha)	<i>712.9km<sup>2</sup> which equates to 71219ha</i>
Overall water body status (2018)	<i>Moderate</i>
Ecological status	<i>Good</i>
Chemical status	<i>Moderate</i>
Target water body status and deadline	<i>Not Designated</i>
Hydromorphology status of water body	<i>Not Designated</i>
Heavily modified water body and for what use	<i>No</i>
Higher sensitivity habitats present	<i>Not within the scheme footprint</i>
Lower sensitivity habitats present	<i>Intertidal soft sediment (mudflats and sandflats), gravel and cobbles (intertidal and subtidal coarse sediment), subtidal soft sediment (sand, mud and mixed), rocky shore (intertidal rock)</i>
Phytoplankton status	<i>Not specified</i>
History of harmful algae	<i>Not specified</i>
WFD protected areas within 2km	<i>Pen Llyn a'r Sarnau SAC, Meirionnydd Oakwoods and Bat Sites SAC, Abermawddach SSSI (also part of Pen Llyn a'r Sarnau SAC).</i>

### **WFD Assessment - Screening:**

The WFD is also required in support of a Band 2 Marine Licence Application, by NRW.

### **WFD Assessment – Scoping Exercise:**

The scoping exercise is carried out to identify all the potential risks to each receptor element that are used to determine the status of the waterbody. The receptors / elements are:

- Hydromorphology
- biology – habitats
- biology – fish
- water quality
- protected areas

These receptors are based on the water body's quality elements (supporting elements, biological elements, and chemical elements).

The scoping exercise has been undertaken following the template provided on the gov.uk<sup>2</sup> website.

### **Hydromorphology:**

Consider if your activity:	Yes	No	Hydromorphology risk issue(s) / observations
Could impact on the hydro morphology (for example morphology or tidal patterns) of a water body at high status	Requires impact assessment	Impact assessment not required	The proposal does not impact on a waterbody of high status.
Could significantly impact the hydro morphology of any water body	Requires impact assessment	Impact assessment not required	The proposal could impact the hydro morphology of the beach through the movement/deposit of sand onto the foreshore, and therefore requires further assessment in relation to both the Mawddach Estuary and Cardigan Bay waterbodies.

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<sup>2</sup> <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters#contents>

Is in a water body that is heavily modified for the same use as your activity	Requires impact assessment	Impact assessment not required	The proposed activity is not within a waterbody classed as heavily modified.
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### **Biology - habitats:**

Consider if habitats are at risk from your activity.

Higher sensitivity habitats <sup>3</sup>	Lower sensitivity habitats <sup>4</sup>
chalk reef	cobbles, gravel and shingle
clam, cockle and oyster beds	intertidal soft sediments like sand and mud
intertidal seagrass	rocky shore
maerl	subtidal boulder fields
mussel beds, including blue and horse mussel	subtidal rocky reef
polychaete reef	subtidal soft sediments like sand and mud
saltmarsh	
subtidal kelp beds	
subtidal seagrass	

Consider if the footprint <sup>5</sup> of your activity is:	Yes	No	Biology habitats risk issue(s) / observations
0.5km <sup>2</sup> or larger	Yes to one or more – requires impact assessment	No to all impact assessment not required	No – the total area of the proposed activity is 0.5ha, which equates to 0.005km <sup>2</sup> .
1% or more of the water body's area			No - the total area of the Mawddach water body is 951 ha, and Cardiagan Bay water body is 71219ha. The area of proposed activity does not exceed 0.5ha, which represents less than 1% of the waterbody areas.
Within 500m of any higher sensitivity habitat			No – the activity isn't within 500m of higher sensitivity habitat.

<sup>3</sup> Higher sensitivity habitats have a low resistance to, and recovery rate, from human pressures.

<sup>4</sup> Lower sensitivity habitats have a medium to high resistance to, and recovery rate from, human pressures.

<sup>5</sup> Note that a footprint may also be a temperature or sediment plume. For dredging activity, a footprint is 1.5 times the dredge area.

1% or more of any lower sensitivity habitat			No – There are lower sensitivity habitats within the area of the works (intertidal soft sediments like sand and mud). However, the footprint of the scheme would not exceed a total area of more than 1% of the habitat area.

### **Biology – fish**

Consider if fish are at risk from your activity, but only if your activity is in an estuary or could affect fish in or entering an estuary.

Consider if your activity:	Yes	No	Biology fish risk issue(s) / observations
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary	Continue with questions	Go to next section	Whilst the work is located on the lower reaches of Afon Mawddach, the work does not involve creating any physical barriers within the watercourse that would impact fish movement. No other works, such as piling within the water column, is scheduled either that would result in underwater noise that would deter fish from migrating up the river. Any tidal work would be undertaken at low to mid water in the dry.
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)	Requires impact assessment	Impact assessment not required	Not applicable
Could cause entrainment or impingement of fish	Requires impact assessment	Impact assessment not required	Not applicable

### **Water Quality:**

Consider if water quality is at risk from your activity.

Consider if your activity:	Yes	No	Water quality risk issue(s) / observations
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)	Requires impact assessment	Impact assessment not required	No – the proposed work would predominantly be carried out above tide level, and therefore would not directly impact water clarity, temperature, oxygen levels, nutrients or microbial patterns of the water body, especially not for continuous periods longer than 14 days. There may be some discolouration of water and sediment resuspension, however, this would clear within 1 tidal cycle i.e. high water – low water – high water
Is in a water body with a phytoplankton status of moderate, poor or bad	Requires impact assessment	Impact assessment not required	No – From available information, the waterbody does not have a phytoplankton status of moderate, poor or bad.
Is in a water body with a history of harmful algae	Requires impact assessment	Impact assessment not required	No – As far as we are aware, the waterbody does not have a history of harmful algae.

Consider if water quality is at risk from your activity through the use, release or disturbance of chemicals.

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s) / observations
The chemicals are on the Environmental Quality Standards Directive (EQSD) list	Requires impact assessment	Impact assessment not required	Plant machinery will be required to undertake the proposed activity, and therefore there is an inherent risk of releasing oils and fuels into the environment, albeit, the risk is considered to be low. Further assessment is required in relation to both waterbodies to ensure adequate measures are in place to prevent the accidental spilling of chemical pollutants.
It disturbs sediment with contaminants above Cefas Action Level 1	Requires impact assessment	Impact assessment not required	No – we have no reason to believe that the activity would disturb sediments with contaminants above Cefas Action Level 1.

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Yes	No	Water quality risk issue(s) / observations
The chemicals released are on the Environmental Quality Standards Directive (EQSD) list	Requires impact assessment <sup>5</sup>	Impact assessment not required	No – the proposal does not discharge any chemicals to the waterbodies.

## **WFD Protected Areas**

Consider if WFD protected areas are at risk from your activity. These include:

- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- Shellfish waters
- Bathing Waters
- Nutrient Sensitive Areas

Consider if your activity is:	Yes	No	Protected areas risk issue(s) / observations
Within 2km of any WFD protected area <sup>6</sup>	Requires impact assessment	Impact assessment not required	The activity is within close proximity to the Pen Llyn a'r Sarnau SAC and the Aber Mawddach SSSI. The Mawddach Shellfish Water Protected Area and there are two designated bathing waters within the local area.

## **Invasive Non-Native Species (INNS)**

Consider if there is a risk your activity could introduce or spread INNS.

Risks of introducing or spreading INNS include:

- materials or equipment that have come from, had use in or travelled through other water bodies
- activities that help spread existing INNS, either within the immediate water body or other water bodies



Consider if your activity could:	Yes	No	INNS risk issue(s) / observations
Introduce or spread INNS	Requires impact assessment	Impact assessment not required	<p>The works will be carried out by terrestrial plant and machinery in dry conditions (above tide level), therefore the risk of introducing marine or water based INNS is negligible.</p> <p>The risk will be managed further by ensuring the plant are cleaned before leaving the existing / preceding site, and are clean on arrival onto this site.</p> <p>No material import is required as part of the scheme.</p>

### Summary of Scoping:

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	Yes	The proposal could impact the hydro morphology of the beach through the movement/deposit of sand onto the foreshore, and therefore requires further assessment in relation to both the Mawddach Estuary and Cardigan Bay waterbodies.
Biology: habitats	No	Total area is less than 0.5km <sup>2</sup> , is less than 1% of water body area and does not meet the higher or lower sensitivity habitat thresholds.

Biology: fish	No	Whilst the work is located within the Mawddach Estuary, the work does not involve creating any physical barriers within the watercourse that would impact fish movement. No other works such as piling in the water column is scheduled either that would result in noise that would deter fish from migrating up the river.
Water quality	Yes	Plant and machinery will be required to undertake the proposed activity, and therefore there is an inherent risk of releasing oils and fuels (PAHs) into the environment, albeit, the risk is considered to be low.
Protected areas	Yes	The proposed activity is being undertaken on the boundary of a protected area, therefore, potential impact to protected sites cannot be ruled out at scoping stage.
Invasive non-native species	No	The works will be carried out by terrestrial plant and machinery in dry conditions (above tide level), therefore the risk of introducing marine or water-based INNS is negligible. The risk will be managed further by ensuring the plant are cleaned before leaving the existing / preceding site and are clean on arrival onto this site.

### ***Assessment of impacts on waterbody quality elements***

#### ***WFD Compliance***

There are three key objectives against which the impacts of proposed works on a water body need to be assessed to determine compliance with the overarching objectives of the WFD:

- Objective 1: The Scheme will not cause deterioration in any element of water body classification.
- Objective 2: The Scheme will not prevent the WFD status objectives from being reached within the water body or other downstream water bodies.
- Objective 3: The Scheme will contribute to the delivery of the relevant WFD objectives. In this case it will be what contribution the Scheme can make towards the water body reaching its objective Good Ecological Potential (GEP) through planned RBMP mitigation measures.

The first two objections must be met to avoid infringement of the WFD. The delivery of the third objective is central to the implementation of the WFD, where it can be supported through its operational activities. If it is considered that the scheme is likely to cause deterioration in water body status or prevent a water body from meeting its ecological objectives then an assessment would be

made against the conditions listed in Article 4.7 of the WFD. Article 4.7 can be invoked if; 'new modifications' are of overriding public interest and/or the environmental and social benefits of achieving the WFD objectives are outweighed by the benefits of the new modifications to human health, safety and sustainable development; there are no significantly better environmental options that are technically feasible or not disproportionately costly; and all practicable steps for mitigation have been taken.

### *Hydromorphology*

The scoping exercise identified that the moving of windblown sand back onto the beach area requires assessment from a hydromorphological perspective. It is proposed that sand will be deposited at two separate locations, which includes the sand dunes at the southern end of the beach and on the beach at the north end of the prom, as explained in the introduction.

According to the West of Wales Shoreline Management Plan (SMP2), there is a general drift to the north over the lower foreshore, as evidenced by the shape of the outer banks of the estuary and by the lower shore ridges further north, but that at the upper shoreline the drift is more variable, and particularly north of Llanaber, very weak. The southerly drift along the Barmouth frontage is evidenced by the growth of the beach to the south. The northern part of Barmouth Beach has experienced sediment loss and falling levels for decades, whereas the southern part of the beach has experienced sediment accretion and rising beach levels (KPAL 2016).

The area identified to deposit sand within the dunes has been selected following a study and report undertaken by KPAL. The upper beach here is typically covered by storm tides on a small number of occasions each winter, however, for much of the year a wide area of the upper beach is unaffected by tides and is exposed to wind action. It is therefore concluded that the sand deposited within the sand dunes will not impact upon hydromorphological processes.

It is likely that sand deposited within the intertidal area at the north end of the prom will be transported in a southerly direction over time, in line with the southerly drift along the Barmouth frontage. However, it is also feasible that some sediment could make its way out to the lower foreshore area, where it would be influenced by the dominant northerly drift in this area. Considering the scale and frequency of the proposed works, and the fact that most of the sediment is likely to remain within the same cycle along the Barmouth frontage as explained above, it is considered unlikely that the movement of deposited sediment will adversely impact upon the hydromorphological processes in the area. This is provided that the sediment deposition itself is carried out in a manner that does not alter the beach profile which could potentially alter the physical processes.

Changing the profile of the beach at the north end of the promenade has the potential to modify physical processes in the deposition area. As detailed above and shown in Appendix B, the northern part of Barmouth Beach experiences sediment loss and falling levels. KPAL 2016, demonstrates the changes in surface elevation between Feb 2003 and June 2016 (Appendix B). The north beach, between 2003 and 2016, has experienced a net loss of approximately  $20 \times 10^3 \text{ m}^3$  below MHWN (KPAL, 2016).

The proposals involve using a dumper to transport sand collected from the prom adjacent to the southern part of the beach to the deposit area at the northern end of the beach. Sand will be removed from the dumper and lowered down on to the beach by excavator from the prom above. Considering the plant / machinery used, and the nature and scale of the proposals, it is not considered likely that the deposit of sand on the northern area of the beach will modify the physical processes in play, due to the

amount of sand involved. The nature of the work means that transportation time, loading / depositing time, limits the amount of sand that will be transported within a day (within a tidal cycle). The sand can also be placed along the beach so that it is spread evenly across the area, rather than in one stockpile. Therefore, as the operation will be spread out over several days, there will be tidal cycles in between periods of sand deposition, therefore beach profile is not expected to be altered in this area. It is therefore expected that there will be a negligible impact on hydromorphology.

### **Water Quality**

Plant and machinery will be required to undertake the proposed activity, and therefore there is an inherent risk of releasing oils and fuels into the environment, although the risk is considered to be low due to no in water works, the impact on the waterbody could not be completely ruled out at the scoping stage. The following Reasonable Avoidance and Mitigation Measures will be implemented during the course of the proposed work:

- Use biodegradable lubricant and hydraulic oil in plant machinery if possible. Biodegradable oils are less toxic than most synthetic oil but should be stored to the same standards as other oils and prevented from entering the water environment;
- Implement best practice to ensure good housekeeping, for example ensuring all machinery used is kept to good repair and subject to regular checks;
- Use of spill kits and personnel trained to use the kit will be available on site on case of oil leak.
- Good working practices will be taken, such as adhering to GPP5 Works and maintenance in or near water. Pollution prevention measures to be stipulated in a Construction Environmental Management Plan (CEMP)
- Use of machinery on the foreshore is reduced to only the deposit of sand within the sand dune area.
- NRW emergency help line (0300 065 3000) will be contacted in the case of an emergency spill.

Since the plant and machinery would not directly enter the waterbody, and assuming that machinery used are well maintained, it is considered unlikely that the proposed activity would result in a contravention of Objective 1. However, accidents do happen – and by having the above measures in place it will reduce any impact should an accidental spill occur.

The movement and deposit of sand could also be a source of pollution, should the material be contaminated prior to being moved. To better understand this risk, analysis has been undertaken of the sand that collects along the promenade road, to identify if the sand can be returned to the beach safely. Samples were taken of windblown sand collected on the promenade at two separate locations. The samples were taken during December 2022, and this sand had been in situ for at least two weeks. A sample of sand was also taken from the beach itself to provide a representative comparison. The analysis of the samples taken concluded that there were no additional contamination levels found within the sand present on the promenade area. It is therefore concluded that the risk of wind blown sand collected on the promenade area and moved back onto the beach being a source of pollution is negligible. Concentrations of polluting material could be released on the promenade in the event of a one-off accident or spillage, and operatives will need to be vigilant to ensure that any such contaminated sand is disposed of accordingly and not taken back

onto the beach. Taking a representative sample of sand prior to each movement has been considered, however this is not deemed practical due to the turnaround time of getting the samples analysed and having the results available. This also would not mitigate against the risk of there being some contamination within the sand in one discreet location as a result of an accidental spillage, as this would need to coincide with an area sampled.

### ***Protected Areas***

The proposed work is located within 2km of WFD Protected Areas, namely Pen Llyn a'r Sarnau SAC and Aber Mawddach SSSI. The Mawddach Shellfish Water Protected Area is also located within 2km and there are two designated bathing waters within the local area. Since there are engineering works within 2km of these protected areas, and a potential impact pathways in the form of tidal action, impact upon these receptors could not be ruled out at scoping stage

A Habitat Regulations Assessment (CPF8200 Barmouth Beach Management Habitat Regulations Assessment – available as a separate document), has been produced for the works. Whilst Likely Significant Effect could not be ruled out in the screening stage (Stage 1 – Test of Likely Significant Effect), due to the potential for pollution of habitat features and foraging habitat. A conclusion of No likely Significant Effect was reached at Stage 2 with the implementation of Reasonable Avoidance Measures. Therefore it is considered that the proposed activity will not result in the contravention of Objective 1.

The mitigation measures can be found in Table 10 of the HRA.

### ***Conclusion***

It is established through the assessment above that by implementing good working practices and reasonable avoidance measures that the proposed works would not lead to deterioration of any quality element of the waterbodies (objective 1) nor would prevent the overall objectives for the waterbodies being met (Objective 2).

## ***Appendices***

***KPAL Report 020522 – Barmouth Beach Blown Sand Management Options Further Report (2022) (as separate document)***

***YGC - Barmouth Beach Management Habitats Regulations Assessment (HRA) (as separate document)***

Appendix A – Site location plans



Figure 1: Location plan showing locations of the sand collection and deposit areas.









October 12, 2023

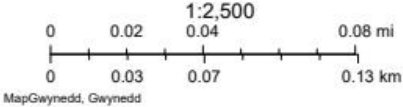
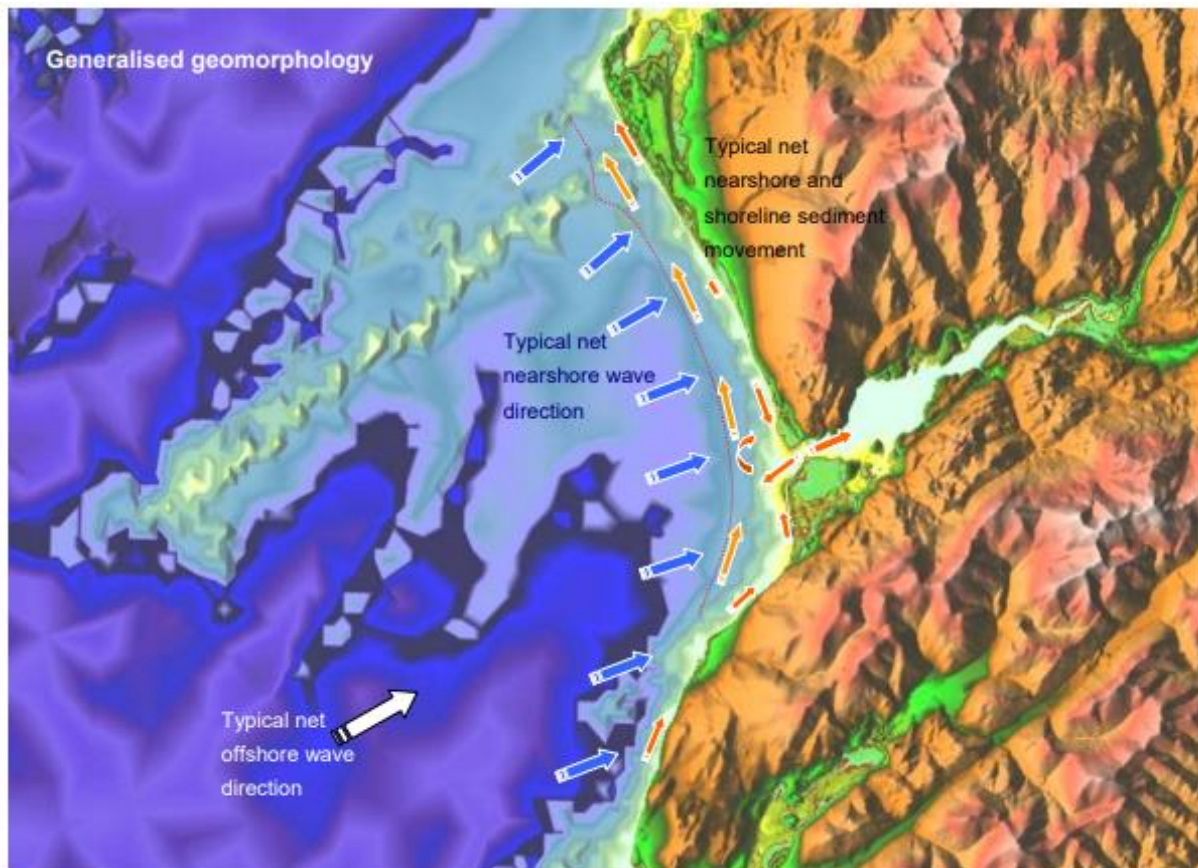
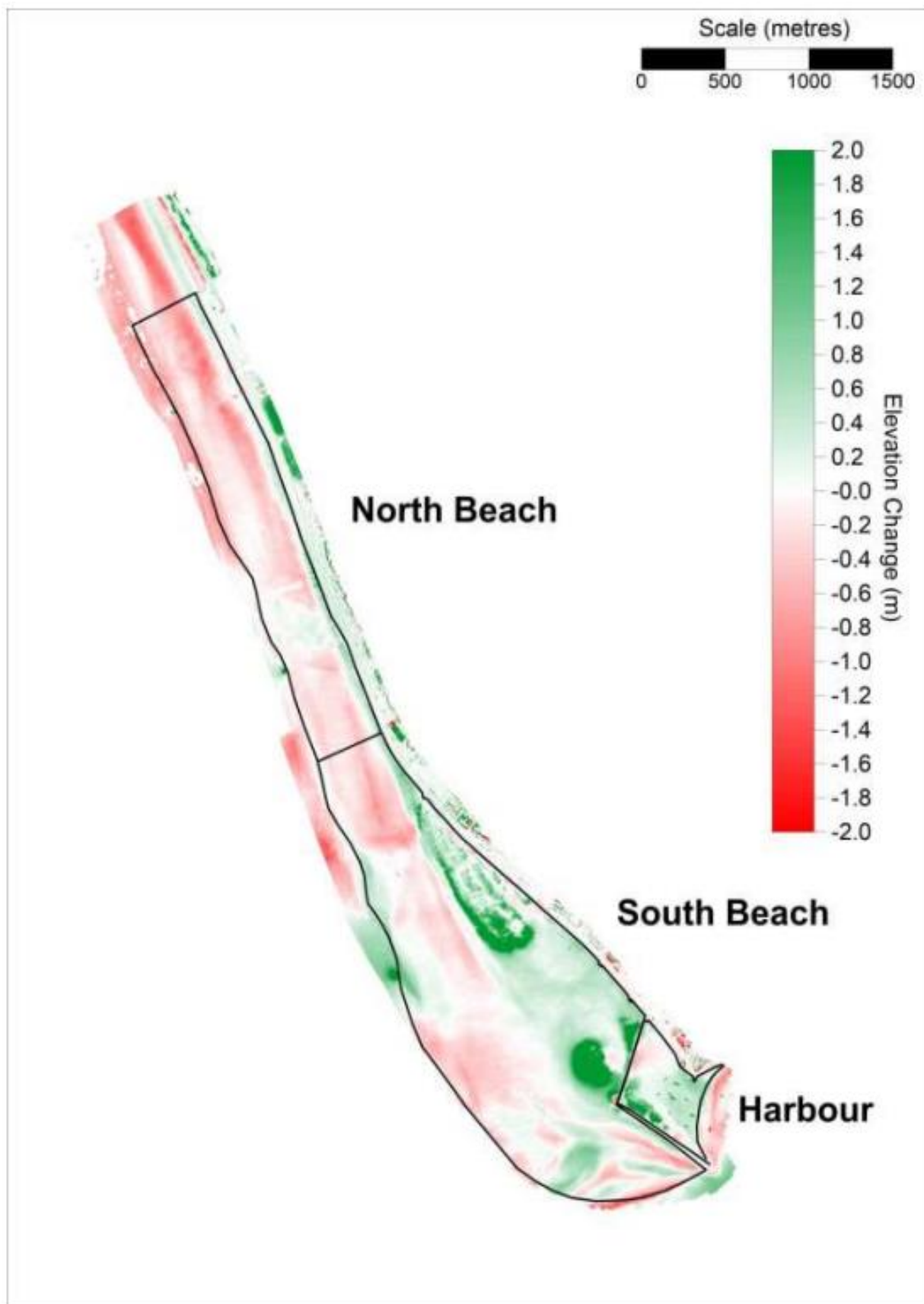


Figure 3: Location plan for operations at north end of Barmouth beach.

## Appendix B – Coastal Processes and beach profile



Generalised bathymetry and topography of the Barmouth area, showing indicative offshore and nearshore wave and sediment transport directions after (Royal Haskoning, 2011a,b)



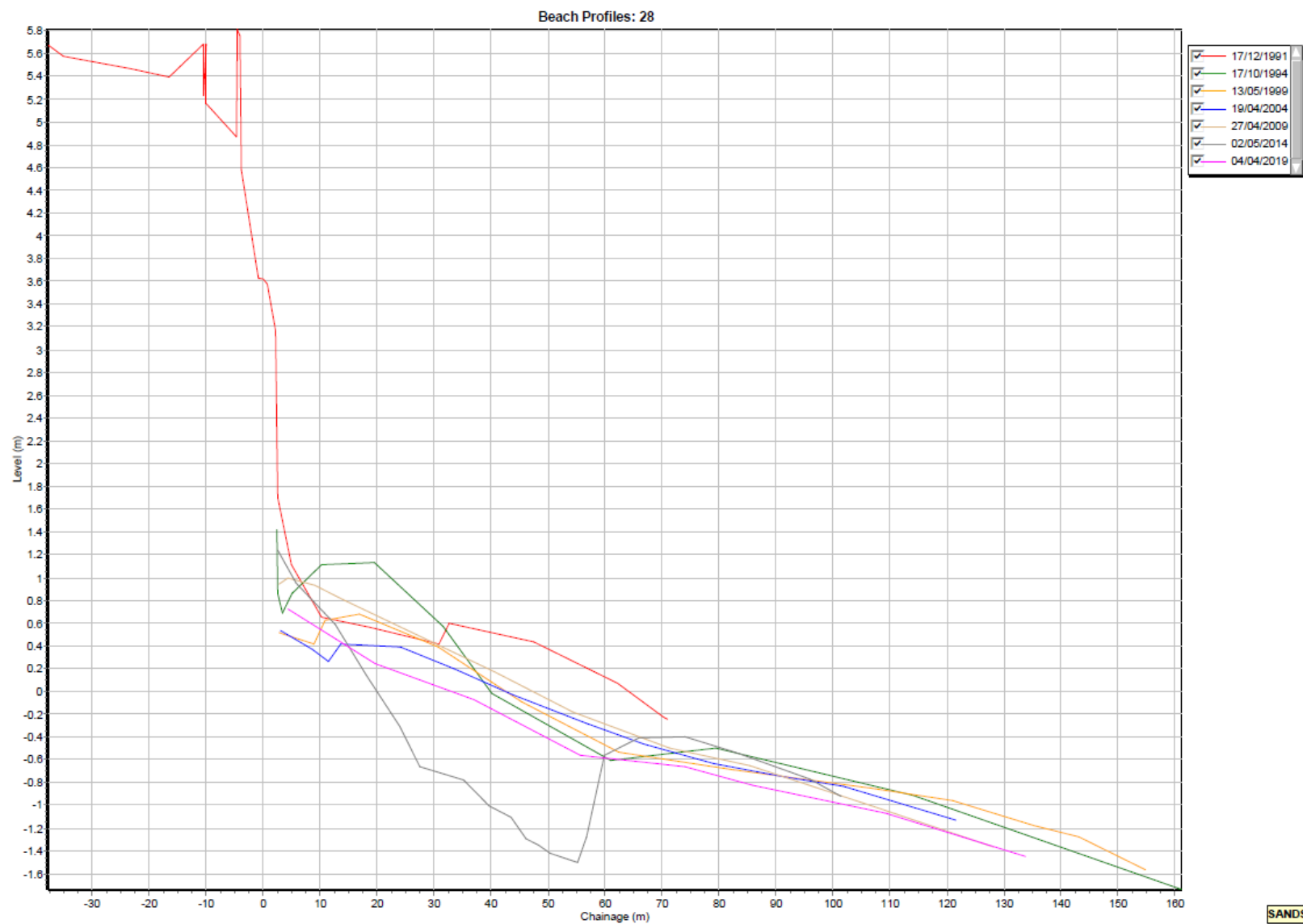
Change in elevation between 14/02/2003 and 16/06/2016, calculated from the difference between digital elevation models generated from 2003 LiDAR and 2016 UAV surveys. (Source: KPAL, 2016)







Location of Beach Profile 28 at north prom deposit site.



Beach profile 28 at North Prom deposit site. (Source: Gwynedd Council)

