



Pwllheli Harbour
Groyne Modification
Water Framework
Directive
Assessment

CPF6434



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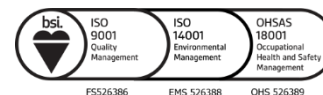
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BACKGROUND

YGC have been commissioned by Gwynedd Council's Maritime Department to design and take forward to construction, a replacement groyne structure at the southern side of the harbour entrance in order to help alleviate the problem of silt accumulation in the harbour entrance.

Several coastal processes and conditions influence how sediment is transported within the coastal environment, such as wind, tidal currents, bathymetry etc. and studies have shown that there is a net easterly drift of sediment along the South Beach frontage of Pwllheli towards the harbour entrance. When the Marina at Pwllheli was developed in the early 1990's, coastal structures were constructed in order to facilitate the entrance to and from the marina. On the northern side of the entrance, a rock armour training arm was constructed and a crib groyne structure was constructed on the southern side. For the purpose of this assessment, the main focus will be on the crib groyne. The main objective of the crib groyne was to hinder/prevent the sediment that was being transported along the south beach frontage from accumulating at the harbour entrance, allowing the sediment to continue in an easterly direction in line with natural processes. The crib groyne is currently in a dilapidated state, with missing fill material and damaged railings and piles. Information has shown that dredging has been carried out to clear the sediment from the harbour entrance on an annual basis from 2009, which suggests that the existing groyne is not fulfilling its original purpose.

In 2014, Arup was commissioned by Gwynedd Council to review dredging arrangement at Pwllheli, and prepare a Maintenance Dredging Strategy for the harbour covering the period 2015-2025. The final strategy, published in 2016, also identified measures to help manage sediment movement at the harbour entrance, which included modification of the exiting groyne. In 2017, CEUK¹ was commissioned by Gwynedd Council to review the existing groyne and local conditions and to present various modification options, of which, Gwynedd Council decided to pursue the proposal to renew the existing structure, but using a rock armour groyne which offers a more sustainable solution, being easier to construct and maintain, and also meaning that no disruptive pilling operations would be necessary.

INTRODUCTION

CEUK have produced outline designs of the proposed groyne, and is currently developing the detailed design. See '**proposal**' below for details. The proposal will be subject to a Marine Licence by Natural Resource Wales, and must also follow the guidelines set out by the WFD legislation² and not cause negative effects to the water

¹ Pwllheli Harbour Crib Groyne Assessment and Review, CEUK, 2017.

² Water Framework Directive (WFD)- The WFD requires us to aim to meet good status in all water bodies. The Water Framework Directive (Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy) is a [European Union directive](#) which commits [European](#)

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 of whether the proposals complies 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;

[Union](#) member states to achieve good qualitative and quantitative status of all [water bodies](#) (including marine waters up to one nautical mile from shore) by 2015.

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For a groundwater water body to be in overall 'good' status, both quantitative and chemical status must be 'good'.

Where water bodies are currently at less than good status we have planned a series of improvement measures.

The WFD also requires prevention of deterioration in water body status including deterioration of any of the individual quality elements. The 'no deterioration position statement' gives further information on this requirement.

- 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.

THE PROPOSAL

The proposal concerns a groyne structure located on the southern side of the Pwllheli harbour entrance (NGR SH 38899 34532). The existing crib groyne structure was constructed in the early 1990s in order to manage sediment movement at the harbour entrance. Over the years, the condition of the groyne has deteriorated to such an extent that it no longer performs its intended function. The existing groyne has damaged and missing wallings and piles, which forms the crib structure to contain the boulders and fill material, and as a result, the boulders and fill material have been dislodged and washed/moved out of the structure by wave action, leaving voids through which sediment can be transported, contributing to the siltation of the harbour entrance. The fact that the existing stones have been moved suggests that they were too small or light for the wave climate that is experienced at site.

CEUK provides a more detailed description of the existing groyne:

The existing groyne is a 3.5 metre wide vertical sided crib construction constructed from 27 sets of 7.5 metre long vertical bullhead rail piles at 3.5 metre centres longitudinally. The pairs of piles are horizontally braced at 3.8 metres below the top of the pile and diagonally braced at each vertical pile location, alternately left hand and right hand. The sides of the groyne comprised 7/8 bullhead rail wallings, along each side at 600mm centres

vertically. The first 6 sets of piles were set at a top level of 4.2m ODN with the level reducing uniformly to 0.0m ODN. The inside of the groyne was infilled with 1-1.5 tonne rock fill down to the bottom wailing level. ³

The proposal would involve removal of the existing cribwork from 0.5m below ground, removing, grade and replacing the existing armour stone and overlaying with additional appropriately sized armour. Overlaying the structure would be carried out using armour stone of a larger size than used in the original construction – preliminary examination (to be confirmed) suggests this should be typically 2-5t in weight, rather than the 1-1.5t used in the original construction, available from local sources e.g. Minffordd.

In terms of dimensions, the proposed groyne would extend to approximately 125m, which would be between 15-20m longer than the existing groyne to accommodate the required slopes. The crest of the proposed groyne would have a nominal width of between 2-3m. With side slopes of 1:2 (southern side) and 1:2.5 (northern side), the footprint of the structure on the ground will vary along its length, with the footprint increasing as the groyne extends seaward due to the sloping nature of the ground. See Drawing No. 74/1807/1/01 and 74/1807/1/01, in the Appendix A, for details.

WFD ASSESSMENT / COMPLIANCE

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’.

³ Pwllheli harbour Crib Groyne Assessment and Review, CEUK, September 2017.

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)⁴ and provides a baseline condition against which compliance and future improvements can be measured.

The proposed work concerns a groyne structure that would be constructed below the Mean High Water Spring Tide (MHWS) level and the waterbody potentially affected by this activity is Tremadog Bay, which falls within the Llyn and Eifionydd Catchment of the Western Wales River Basin. Its status classifications are detailed below:

Water body	Description, notes or more information
WFD water body name	<i>Tremadog Bay</i>
Water body ID	<i>GB651009350000</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>239km² (23,900ha)</i>
Overall water body status (2015)	<i>Good</i>
Ecological status	<i>Good</i>
Chemical status	<i>Good</i>
Target water body status and deadline	<i>Not Designated</i>
Hydromorphology status of water body	<i>Not Designated A/HMWB</i>
Heavily modified water body and for what use	<i>No</i>
Higher sensitivity habitats present	<i>None within close proximity of the proposed work, mussel beds approximately 400m from the proposed work.</i>
Lower sensitivity habitats present	<i>Intertidal soft sediment, gravel and cobbles, rockyshores (as per Magicmap data)</i>

⁴Western Wales RBMP- By 2015, 13 per cent of surface waters (rivers, lakes, estuaries and coastal waters) in this river basin district are going to improve for at least one biological, chemical or physical element, measured as part of an assessment of good status according to the WFD. Currently only 29 per cent of surface waters are currently classified as good or better ecological status/potential. 51 per cent of assessed surface water bodies are at good biological status.

Phytoplankton status	<i>Not known</i>
History of harmful algae	<i>None</i>
WFD protected areas within 2km	<i>Pen Llyn a'r Sarnau SAC (directly adjacent)</i>

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.

ASSESSMENT OF IMPACTS ON WATER BODY QUALITY ELEMENTS

At the scoping stage you must identify all your activity's 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), see classification above.

A scoping exercise is included in Appendix C of this report, which has been obtained from the www.gov.uk website⁵. The result of the scoping exercise is summarised below, and also an assessment is made as to whether the proposed work complies with the overarching objectives of the WFD, where the scoping exercise have identified potential risk to these receptors.

HYDROMORPHOLOGY:

The scheme involves constructing a groyne structure that would replace an existing groyne structure, and the function of the proposed groyne would be the same as that of the existing, in the sense that it would help manage sediment movement in and around the harbour entrance. The proposed new groyne would be better, and more efficient in managing sediment movement locally, since it would have a higher crest level than the current groyne to reduce overtopping and deposition of sediment in the entrance channel. The new groyne would be intact and constructed using larger stones, which means that they won't become dislodged during extreme events, and it is likely that sediment transportation through the groyne would be reduced. The length of the proposed groyne would be longer by approximately 15-20m. The additional 15-20m is to curtail the groyne back to ground level, with a slope of 3:1. Whilst there may be changes in hydromorphology, the changes are considered to be minimal and very localised i.e. in and around the harbour entrance. **This change to hydromorphology is not considered to be significant, and considered unlikely that it would lead to deterioration in overall quality of the waterbody nor prevent the WFD status objectives from being reached**

BIOLOGY – HABITAT:

The footprint of the proposed work (temporary & permanent) is not likely to exceed 0.3ha, which constitute approximately 0.0012% of the waterbody area.

⁵ <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters>

Mussel beds have been identified⁶ approximately 400m south of the proposed activity. Mussel beds are considered to be habitat that are of higher sensitivity, which means they have low resistance to, and recovery rate, from human pressures. It is not considered that the proposed work / activity would lead to direct loss of this habitat, since the work would be undertaken away from the mussel beds (400m) and most of the work would be done above the tidal level, which would segregate the works from the receptor, thus eliminating an impact pathway. However, the seaward extent (last 10m) of the proposed groyne would be submerged at low tides, and as such, there is still potential impact which could occur, such as accidental spillages / leakages from plant machinery into the sea, which needs to be considered along with available avoidance / mitigation measures which could be implemented.

The avoidance / mitigation measures implemented would include:

- Timing the work at the seaward end to coincide with low tide (springs).
- Ensure the plant machinery work from the landward face of the works at all times, so to avoid any part of the plant machinery becoming submerged by seawater at any time during construction.
- Ensure that all plants are supplied with bio-degradable oils, and are well maintained.
- Contractors would need to comply with all relevant Good Working Guidelines, such as GPP5: Work or maintenance in or near water, and PPG6: Work on Construction and Demolition Sites.
- Contractors would need to submit a Construction Phase Environmental Management Plan to outline how they would safeguard the environment.

Bearing in mind the nature of the works, the distance from the receptor, and by considering that reasonable impact avoidance measures that could easily be implemented to safeguard the environment, **it is not considered likely that the activity would lead to deterioration in the quality of this receptor, the overall quality of the waterbody nor prevent the WFD status objectives from being reached.**

There are cobbles, gravel and shingles, and soft sediment adjacent to the existing groyne. These habitats are considered to be a lower sensitivity habitat, which are habitat that have medium to high resistance to, and recovery from, human pressures. The footprint of the proposed work would lead to a slight loss of these habitats, since the footprint of the proposed groyne would be greater than the existing. The increase of the footprint would not lead to loss of habitat greater than 1% of the total area of these habitats within the waterbody, **therefore it is not considered likely that the loss of lower sensitivity habitat would lead to deterioration if the habitat receptor within the waterbody, the overall quality of the waterbody nor prevent the WFD status objectives from being reached.**

BIOLOGY – FISH:

The proposed work would not create a physical barrier which would prevent the migration of fish, would not change the flow or depth of the waterbody, nor would it directly impact any fish spawning habitat. However, the work is likely to result in some degree of underwater noise, in particular during the phase at which the boulders would be placed at the most seaward end of the proposed new groyne, and possibly during the

⁶ Intertidal Phase 1 Habitat Survey. Contains Natural Resources Wales information © Natural Resources Wales and Database Right. All rights Reserved. Contains Ordnance Survey Data. Ordnance Survey Licence number 100019741. Crown Copyright and Database Right.

installation of a new navigation marker, as a result of piling (to be confirmed in detailed design). Two rivers, Afon Erch and Afon Rhyd-Hir meet in the harbour at Pwllheli before discharging into Tremadog Bay via the harbour entrance. Work will be carried out within close proximity of the harbour entrance and therefore could potentially affect fish migrating to and from these watercourses.

The following extract is taken from the Environmental Statement produced by Cascade Consulting for the Welsh National Sailing Academy and Events Centre in Pwllheli works to show how fish species use the harbour and harbour entrance at Pwllheli:

Data provided by the Natural Resources Wales indicate that the Afon Erch and Afon Rhyd-Hir are important for migratory salmonids, including salmon (Salmo salar) and sea trout (Salmo trutta). These species are likely to enter Pwllheli Harbour from April with many arriving to migrate upstream in late summer until October, to spawn upstream in gravels. Smolts tend to move out of the rivers and through Pwllheli Harbour in the spring (March and April). Data supplied by the Natural Resources Wales for the period 2005 to 2011 indicates that the Afon Erch tends to be within the top 40% of national rivers for a salmon fishery of this type, which gives it a rating of Excellent to Good according to the National Fishery Classification Scheme. The Afon Erch rates slightly lower for trout, although still rates between Good and Fair in a national context.

European eel (Anguilla anguilla) and lamprey species are also present in the Afon Erch. European eel are in decline throughout Europe and are a UKBAP priority species and protected under the Eels (England and Wales) Regulations 2009. An average of 15 eel was caught from three sites in the river in 2011. No records have been received to indicate the presence of these species in the Afon Rhyd Hir. Elvers (juvenile eel) migrate into estuaries and rivers during spring and adult eel leave the rivers and coastal area in late summer and autumn.

River lamprey (Lampetra fluviatilis) and brook lamprey (Lampetra planeri) have been recorded in the Afon Erch in low abundance. Both of these species are listed in Annex II of the Habitats Directive (92/43/EEC), with river lamprey being afforded additional protection by its inclusion in Annex V. Low numbers of brook/river lamprey ammocoetes (larvae) were reported at surveys undertaken at three sites on the Afon Erch in 2011. River lamprey are diadromous (migrating between fresh and salt water) and migrate from the sea to spawning grounds in rivers from November to December, whereas brook lamprey complete their life cycle solely within freshwater habitats and do not undertake diadromous migration.

Non-migratory fish likely to be present within the harbour include sea bass (Dicentrarchus labrax), gobies (Pomatoschistus spp), plaice (Pleuronectes platessa), flounder (Platichthys flesus), black bream (Spondylus cantharus) and grey mullet (Mugilidae spp.)⁷

⁷ WNSAEC, Environmental Statement – Chapter 9, Cascade Consulting

As explained above, various fish migrate to and from the Afon Erch and Rhyd-Hir beyond the harbour entrance at various times of the year, and therefore it is not considered that there would be a more suitable window to undertake the works than the other.

The Environmental Statement also makes an assessment as to how the noise from piling activities would affect fish, and concludes on balance, that there would be some behavioural response from fish in the direct vicinity of the piling operations. However, the zone of influence of vibro-piling noise on fish is likely to be relatively small (approximately 50m), and the result of which is that there may be some barrier to fish during piling operations but for most of the channel area, fish should be able to pass the piling works.

With regard to the proposed groyne works, the noise would be generated more than 120m from the northern extent of the channel, and the noise generated is considered to be less frequent and less intense than the noise generated during piling works that was carried out during the construction phase of the new pontoons and quay wall for the WNSAEC. Based on the assumption that the works would create a zone of influence of approximately 50m, which is considered to be an exaggerated level of influence for these proposals, it is considered that any noise generated would not cause or create a barrier that would prevent any of the fish from migrating to or from the Afon Erch and Rhyd-Hir via the harbour.

Therefore it is not considered that the proposed work / activity would lead to deterioration in the quality of this receptor, the overall quality of the waterbody nor prevent the WFD status objectives from being reached.

WATER QUALITY:

It is not considered that the proposed work could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days), since most of the work will be timed and phased to be carried out above low tide level. Any suspension of sediment or discoloration of the water caused by the work is likely to clear within one tidal cycle (likely to be less), due to the coarse nature of the sediment present at site.

With regards to disturbance of chemicals during the work / activity, there is no reason to believe that the sediment within and around the area of the works have concentrations of contaminants greater than Cefas Level 1. The material collected from in and around the area of works following past dredging campaigns have been stockpiled at the landward end of the proposed new groyne; this material has recently been tested and have returned levels significantly below the Cefas Action Level 1 thresholds.

As plant machinery would be involved in the construction of the proposed groyne, there is an inherent risk of accidental spillages of chemicals such as diesel, engine oil and coolants and hydraulic oil into the waterbody. This could potentially lead to deterioration of the water quality. However, the proposed work would likely be carried out by 1 x tracked excavator and 1 x 38t dump trucks (to be confirmed following tender process), therefore limiting the quantity of chemicals leaked into the environment should the worst case scenario of all machinery leaking their liquid content into the marine environment occur. Furthermore, as for mitigation /

avoidance measures implemented to safeguard the habitat receptor, the same measures would also ensure that water quality is safeguarded. These measures are proven, widely used and uncontroversial.

The avoidance / mitigation measures implemented would include:

- Timing the work at the seaward end to coincide with low tide (springs).
- Ensure the plant machinery work from the landward face of the works at all times, so to avoid any part of the plant machinery becoming submerged by seawater at any time during construction.
- Ensure that all plants are supplied with bio-degradable oils, and are well maintained.
- Contractors would need to comply with all relevant Good Working Guidelines, such as GPP5: Work or maintenance in or near water, and PPG6: Work on Construction and Demolition Sites.
- Contractors would need to submit a Construction Phase Environmental Management Plan to outline how they would safeguard the environment.

By implementing Reasonable Avoidance / Mitigation measures as outlined, **it is not considered likely that the proposed work / activity would lead to deterioration in the quality of this receptor, the overall quality of the waterbody nor prevent the WFD status objectives from being reached**

PROTECTED AREAS:

The proposed work would involve working directly adjacent to Pen Llyn a'r Sarnau SAC, and the proposed groyne would encroach approximately 15-20m into its boundary, see location plan included in Appendix C. The proposed work will be subject to a Habitat Regulation Assessment (HRA) to determine whether the scheme would have any significant effect on the SAC or any of its features (this will be done by NRW as the competent authority during the Marine Licence process). However, from looking at Marine Article 17 Habitat Feature Map⁸, the two features of the SAC potentially affected by the proposed work are:

- Large Shallow Inlets and Bays; and
- Reef

Large Shallow Inlets and Bays:

The proposed groyne would encroach into the SAC, and into the habitat feature 'large shallow inlet and bays'. The groyne would require an area of approximately 320m² of this feature from the SAC, which equates to 0.000077% of the feature from the Tremadog Bay area only, or 0.000056% of the total area of the feature, if combining with the feature area on the northern side of the Llŷn Peninsula.

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<http://lle.gov.wales/map#b=europa&l=1016;990h;994h;996h;998h;1000h;1002h;1004h;1006h;1008h;1010h;1012h;1014h;1018h;&m=-4.39621,52.88807,15>

Reef:

Reef feature have been identified to be present within 300m from the proposed groyne. The proposed groyne would not cause any direct loss of the feature, however, it is noted that reefs are sensitive to changes in hydrodynamics. Due to the small increase in groyne length, it is considered that if any changes in hydrodynamics occur, the changes would be minimal and very localised due to the marginal increase in structure length and since the proposed structure would essentially be constructed to replace the original structure and would serve the same function as that of the original structure.

Whilst there would be some minor loss to a the Large Shallow Inlet and Bays feature area, it is not considered, for the purpose of the WFD, that this loss would **lead to deterioration in the quality of this receptor, the overall quality of the waterbody nor prevent the WFD status objectives from being reached.**

INVASIVE NON-NATIVE SPECIES:

The NRW coastal risk assessment shows that Tremadog Bay is at risk from the following INNS:

- Slipper Limpet
- Leathery Sea Squirt
- Colonial Tunicate

Existing stones will be used within the scheme. However, additional stones would be required, which would be sourced from a quarry (location not known). The risk of introducing INNS by this means is negligible, since it is unlikely that the stones would have been in contact with the marine environment before reaching site. However, plant machinery will be used, and at this stage it cannot be ruled out that the plant would be free from INNS, albeit the probability is low. The risk can be reduced easily by contractors ensuring that plant machinery is clean before arrival at site. The contractor will be required to submit a Biosecurity Method Statement for approval before the work begins. Provided that the contractor adheres to the Biosecurity Method Statement, **it is not considered that the proposed work would lead to deterioration in the quality of this receptor, the overall quality of the waterbody nor prevent the WFD status objectives from being reached.**

SUMMARY AND CONCLUSION

In terms of the quality elements of the waterbody during the operational phase, the proposed groyne may lead to changes in hydromorphology due to the increase in height and the length of the groyne structure and improved integrity, however, these changes are considered to be minimal and very much localised. Other element considered is the protected area. The groyne would encroach into the Large Shallow Inlets and Bays feature of the Pen Llyn a Sarnau SAC. Whilst this element of the proposal may need to be considered further as part of the HRA process, for the purpose of the WFD Assessment it is considered that the scale of the land-take from the SAC would not impact the overall quality of the waterbody.

It is considered that construction related activities, if not managed properly, could impact the quality element of the waterbody, in particular the biological and chemical elements. However, construction activities would be managed through contractors implementing and adhering to measures which are widely recognised and used in the water environment, such as GPP5 Work or maintenance in or near water. With measures in place, enforced through Construction Environmental Management Plan (CEMP), which will be supervised, it is considered that the construction of the proposed groyne would unlikely have an impact on the biological or chemical quality elements of the waterbody.

Overall, it is concluded that the proposed groyne would not cause deterioration in any element of water body classification nor prevent the WFD status objectives from being reached within the water body or other downstream water bodies (Objective 1 & 2).

APPENDICES

(Separate documents)

APPENDIX A:

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- DRAWINGS NO. 1807_1_01
 - DRAWINGS NO. 1807_1_02

APPENDIX B

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- DRAWING NO 6434LP01

APPENDIX C

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- WFD SCOPING REPORT