ARUP

Ymgynghoriaeth Gwynedd Consultancy - Gwynedd Council

Barmouth Viaduct Gardens

Ecological Impact Assessment (EcIA)

Reference: 285699-ARP-XX-RP-ENV-004

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Job number 28569900

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Contents

1.	Introduction	1
1.1	Site Context	1
1.2	Proposed Development	1
1.3	Purpose of this Document	2
1.4	Objectives	2
2.	Legislative and Policy Context	3
2.1	Relevant Legislation	3
2.2	Local planning policy	3
3.	Methodology	5
3.1	Establishing the Ecological Baseline	5
3.2	Field Survey	6
3.3	Assessment Methodology	9
4.	Baseline Conditions	12
4.1	Statutory and Non-Statutory Designated Sites	12
4.2	Phase 1 Habitat Survey	15
4.3	Intertidal Biotope survey	17
4.4	Protected and Notable Species	19
5.	Evaluation of Ecological Features	26
6.	Description of the Proposed Development	30
6.1	Scope of Works	30
6.2	Construction methodology	30
6.3	Assumed Construction Practices and Licence Requirements	31
6.4	Operation	35
7.	Assessment of Effects	36
7.1	Potential Effects	36
7.2	Assessment of Effects	37
7.3	Summary of Significance of Residual Effects	43
7.4	Cumulative Effects	44
7.5	Compensation	45
8.	Enhancement	45
9.	Monitoring and Management	47
10.	Conclusions	48

Tables

Table 1 - Zone of Influence used for this assessment 5

Table 2 Maximum Zone of Impact from Scheme Boundary for Ecological resources 9

Table 3 Statutory designated wildlife sites within 5km (international sites), 2km (national sites) and 10km (bat sites) of the site 12

Table 4 Non-statutory designated wildlife sites within 2km of the site, and AWI site within 500m of the site 13

Table 5 Intertidal Biotopes Recorded 18
Table 6 Evaluation of Ecological Features 26
Table 7: Summary of significance of residual effects 43

Figures

Figure 1a Site Location Plan 50
Figure 1b2Site Location Plan 51
Figure 3 Designated sites: Statutory and non-statutory designated sites 52
Figure 4 Extended Phase 1 Habitat Survey results 53

Appendices

Appendix A 54
Legislation and Policy 54
A.1 Relevant Legislation 54
Appendix B B-1
Design drawings B-1
Appendix C C-1
Preliminary Ecological Appraisal (285699-ARP-XX-RP-ENV-003) C-1
Appendix D D-1
Intertidal Biotope Report D-1
Appendix E E-1
Stage 1 Screening Habitat Regulations Assessment (HRA) E-1
Appendix F F-1
Statement to Inform an Appropriate Assessment (SIAA) F-1

1. Introduction

This Ecological Impact Assessment (EcIA) has been prepared by Ove Arup and Partners Ltd ('Arup') for Ymgynghoriaeth Gwynedd Consultancy (YGC) which is part of Cyngor Gwynedd Council (the Local Planning Authority "LPA"). It supports a marine licence application for Viaduct Gardens Coastal Scheme (hereafter named the 'site').

1.1 Site Context

Barmouth (Abermaw) in Gwynedd, Wales, is located on the northern shore on the mouth of the Mawddach Estuary (NGR: SH 61549 15531) (Figure 1). The sea front at Barmouth suffers from flooding due to both overtopping of the sea wall and surface run-off from the bluff behind the town (Dinas Oleu).

The Viaduct Gardens area is located near St David's Church at the south end of the town and consists of a pedestrianised public space which is bounded landward by the A496 (Porkington Terrace) and Church Street. On the seaward side is a slightly raised parapet seawall which runs along the harbour area and is situated adjacent to the railway viaduct In addition to the railway line and roads, there is other significant infrastructure at this location in the form of a Dŵr Cymru Welsh Water (DCWW) combined pump and combined sewer overflow (CSO), and an electricity substation.

A Project Appraisal Report (PAR) was originally undertaken in 2004. This was updated in 2018 and formed the basis of an Outline Business Case (OBC) approved in June 2021. The OBC presented nine options for coastal flood risk management along the sea front of which Option 8 was preferred; this is described under Section 1.2 below.

1.2 Proposed Development

The proposed development (Option 8) redline boundary is shown in the detailed site location plan (Figure 1b) and consists of improvements to the Viaduct Gardens sea wall. Figure 1b shows the two distinct stretches of the sea front, which are referred to as Frontage 1 and Frontage 2 throughout this report. Detailed drawings are included in Appendix B.

The height of the existing wall will be increased in this area and works are summarised as follows:

- The existing filled garden area behind the existing sea wall will be stabilised through the use of sheet piling and/or king post walls. The installation of these will be mainly from the Viaduct Garden side of the wall.
- Existing wall will be demolished in sections, with the existing rock armour at toe of wall moved back from the wall to expose the face (rock armour material to be re-used upon completion of new wall).
- Construction of new wall consist of lower and middle section, with a reinforced concrete parapet on top. A concrete foundation slab is to be cast in situ, with precast L-shaped units laid on the foundation base. The lower section will be backfilled with mass concrete. The parapet wall will be installed as an in-situ wall once the lower and mid sections are complete. Rock armour is to be installed along the base of the new wall. Previously removed armour will be used, along with some additional armour.
- A new surface water pipe outfall to upgrade the existing highway drainage is to be constructed which involves the installation of a 750mm diameter culvert pipe, which will protrude approx. 22m from the new wall face. Beach material will need to be excavated to accommodate the pipe, which will sit on a concrete mattress (2.4m wide) and be encased in 250mm thick concrete. Rock armour will be placed each side of the pipe at the lower 12m section, and an anti-scour basin will be constructed at the outfall, consisting of rock armour.
- New gulleys and chambers to increase highway drainage capacity and a new pumping station in the terrestrial zone.

The length of the frontage wall to be improved as part of the scheme is approximately 60m.

The construction works associated with this project are limited to the viaduct gardens sea wall and the foreshore area where the new pipe outfall is to be constructed. Machinery access to the intertidal area will be required via the main harbour slipway.

1.3 Purpose of this Document

This Ecological Impact Assessment (EcIA) has been undertaken in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland[1]. It describes and evaluates the ecological resources that have been found within and adjacent to the site; assesses the impacts of construction and operation of the development; and specifies avoidance, embedded mitigation, compensation, enhancement, as well as post construction monitoring and management measures as appropriate to support a marine licence application. The EcIA will need to be updated if it is required to support a full planning application, as this will require an assessment of ecosystem resilience and Net Benefit for Biodiversity, which is not included within this report.

1.4 Objectives

The objectives of the EcIA can be summarised as follows;

- To establish baseline ecological conditions on the site and within the immediate vicinity, including its potential to support notable habitats and notable/protected species;
- To set out the mitigation measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects;
- To identify how mitigation measures will/could be secured;
- To provide an assessment of the significance of any residual effects;
- To identify appropriate enhancement measures; and
- To set out the requirements for post-construction management and monitoring.

[1] CIEEM. (2019). Guidelines For Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Available at: ECIA-Guidelines-Sept-2019.pdf (cieem.net)

2. Legislative and Policy Context

2.1 Relevant Legislation

A list and brief overview of the key legislation that has been taken into account for the purpose of this assessment is detailed below. A full list of relevant legislation and policy is provided in Appendix A.

- The Conservation of Habitats and Species Regulations 2017 - as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019;
- Wildlife and Countryside Act 1981 (as amended) (WCA);
- The Environment (Wales) Act 2016;
- Planning Policy Wales 2021;
- National Park and Access to the Countryside Act 1949 (as amended);
- Countryside and Rights of Way Act 2000 (CRoW);
- The Hedgerow Regulations 1997;
- Protection of Badgers Act 1992;
- Wild Mammals (Protection) Act 1996; and
- The Invasive Alien Species (Enforcement and Permitting) Order 2019.

The Conservation of Habitats and Species Regulations (CHSR) 2017 (as amended) sets out protection for habitats and species listed within its annexes. This includes legislation covering European Protected Species (EPS) and the National Site Network[2] (NSN). The WCA protects a range of wildlife, protecting wild plants listed under Schedule 8, and making it unlawful to plant or otherwise cause to spread in the wild any plant which is listed under Part II of Schedule 9. This legislation must be considered as part of any development proposals regardless of whether planning permission is required.

At the national level, the Environment (Wales) Act 2016 requires public authorities to seek to maintain and enhance biodiversity to promote the resilience of ecosystems when undertaking their functions. This includes consideration of species and habitat listed under Section 7 of this act as those of 'principal importance' to conserving and enhancement biodiversity in Wales. Additionally, Chapter 6 of Planning Policy Wales[3] requires development plan strategies, policies and development proposals to secure the conservation and enhancement of biodiversity, including the conservation of wildlife and habitats, safeguarding the ecological networks and components which underpin them improve ecosystem resilience by improving diversity, condition, extent and connectivity of ecological networks. Further consider

2.2 Local planning policy

Seven local planning policies are set out within the Joint Anglesey and Gwynedd Local Development Plan (LDP) (2011–2025)[4] (see Appendix A). The current LDP encourages 'Conserving and Enhancing the Natural Environment' by recognising the statutory protection afforded to internationally and nationally designated landscapes, sites/ habitats and individual species. This LDP also acknowledges the key role of the planning system in protecting and enhancing the natural environment.

[2] Formerly known as 'Natura 2000 sites' or 'European sites'.

[3] Welsh Government Planning Policy Wales Edition 11. February 2021. Planning Policy Wales - Edition 11 (gov.wales)

[4] https://www.gwynedd.llyw.cymru/en/Council/Documents---Council/Strategies-and-policies/Environment-and-planning/Planning-policy/Anglesey-and-Gwynedd-Joint-Local-Development-Plan-Written-Statement.pdf [Last accessed: 05/04/2022]

The North West Wales Area Statement[5] covers an extensive landscape of settlements, lowland and coastal areas, as well as upland areas (including Snowdonia National Park). Key area statement challenges have been summarised in Appendix A.

Natur Gwynedd is the Local Biodiversity Action Plan (LBAP) for Gwynedd outside the Snowdonia National Park[6]. Key aims, along with habitat and species action plans have also been summarised in Appendix A. Further consideration has also been given to locally Protected Species which may be identified within the Royal Society for the Protection of Birds (RSPB) Birds of Conservation Concern' or Red Data books.

[5] https://naturalresources.wales/about-us/area-statements/north-west-wales-area-statement/?lang=en [online] [Last Accessed: 25/06/2023]

[6] Summary of the plan https://www.gwynedd.llyw.cymru/en/Council/Documents---Council/Strategies-and-policies/Environment-and-planning/Biodiversity/Natur-Gwynedd-Summary.pdf accessed through the website https://www.gwynedd.llyw.cymru/en/Council/Strategies-and-policies/Environment-and-planning/Natur-Gwynedd-Biodiversity-Action-Plan.aspx (Accessed 25/06/23).

3. Methodology

The following sections set out the methodology used to establish baseline conditions and assess the effects of the proposed development both in terms of construction and operational effects.

The baseline ecological information for the proposed development was collated through a combination of a desk study and ecological surveys, as described in the following sections. Survey work was undertaken by a number of suitably qualified professional ecologists employed by Arup. Surveyors were assessed as being competent in terms of their knowledge and experience to lead surveys for that particular species or habitat group.

3.1 Establishing the Ecological Baseline

3.1.1 Desk Study

This EcIA assesses ecological resources including designated sites, habitats and protected and notable species that could be impacted by the proposed development. The current guidance of ecological assessment[1] recommends that all ecological resources that occur within a 'Zone of Influence' (ZoI) for a proposed development are investigated, depending on the nature for the conservation activities and the ecological resources affected. For the assessment, the following zones have been defined (Table 1).

Table 1 - Zone of Influence used for this assessment

Ecological resources	Zone of Influence
Desk study	
International statutory designated sites	5km buffer from the site, or 10km if the site is designated for bats
National Statutory designated sites	2km buffer from the site
Local Statutory designated sites	2km buffer from the site
Non-statutory designated sites	2km buffer from the site
Relevant species records (including protected, notable and INNS)	2km buffer from the site
Ancient Woodland Inventory (AWI)	500m buffer from the site
Veteran Trees	500m buffer from the site
Habitats of principle importance	1km buffer from the site
Field survey	
Protected and notable species	Within the site and habitats immediately adjacent
INNS	Within the site and habitats immediately adjacent
Habitats (Excluding priority habitats)	Within the site and habitats immediately adjacent

Reports referenced to obtain baseline ecological information include the following:

- Preliminary Ecological Appraisal (PEA)[7] report produced by Arup dated May 2022, with the Extended Phase 1 Habitat Survey undertaken in February 2022 (Refer to Appendix C).

[7] Arup (2022) Barmouth Viaduct Gardens- Flood Alleviation Scheme (FAS) Preliminary Ecological Appraisal (PEA) Reference: 285699-ARP-RP-ENV-003

- Intertidal Biotope[8] report produced by Arup dated June 2023, with the field survey undertaken during March 2022 (Refer to Appendix D).
- Stage 1 Screening Habitats Regulation Assessment (HRA) produced by Arup in June 2022[9] (Appendix E).
- Statement to Inform an Appropriate Assessment (SIAA) produced by YGC in June 2023[10] (Appendix FAppendix E).

A desk study was undertaken as part of the PEA to identify any available existing ecological information that is relevant to the site to establish an ecological baseline. The Multi-Agency Geographic Information for the Countryside (MAGIC) website[11] was reviewed for information on internationally designated sites of nature conservation importance within 10km of the site, and nationally and locally designated sites of nature conservation importance within 2km. The search included Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar Sites, Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Nature Reserves. The JNCC website[12], was also reviewed to obtain information on designated sites. In addition to this, protected and notable[13] species, Schedule 9 invasive non-native species and non-statutory site data within 2km of the site were obtained from the local data centre (Cofnod) and have been curtailed to the last ten years to ensure relevance.

The following sources have also been consulted as part of the desk study and for mapping results:

- Cofnod - the Local Environmental Records Centre for North Wales[14]
- Joint Nature Conservation Committee (JNCC)[15];
- Natural Resources Wales Wildlife and Biodiversity Guidance and Advice[16];
- Lle: A Geo-Portal for Wales[17]
- OS Open Maps (https://www.openstreetmap.org);

3.2 Field Survey

3.2.1 Extended Phase 1 Habitat Survey

An Extended Phase 1 Habitat Survey was undertaken by a Suitably Qualified Ecologist (SQE) on 9 and 10 February 2022. The site was inspected to establish the presence, or potential presence, of protected or notable species or habitats (or invasive species) which would be affected by the proposed works. Habitats were mapped on the Extended Phase 1 Habitat Survey Plan with reference to JNCC's Handbook for Phase 1 Habitat Survey[18] within and up to 50m from the site boundary. Target Notes (TNs) were used to highlight

[8] Arup (2023) Barmouth Viaduct Gardens- Flood Alleviation Scheme (FAS) – Intertidal Biotope Report Ref: 285699-ARP-XX-RP-ENV-006_P02.

[9] Arup (2022) Viaduct Gardens, Barmouth - Flood Alleviation Scheme (FAS) Habitats Regulations Assessment (HRA) – Preliminary Screening Report

[10] YGC (2023) Barmouth Viaduct Gardens – Coastal Scheme Habitats Regulations Assessment (HRA)

[11] Magic Map Application (defra.gov.uk) [Accessed June 2023].

[12] JNCC - Adviser to Government on Nature Conservation [Accessed January 2023].

[13] 'Notable' species and habitats considered in this report include species and habitats of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales, under section 7 of the Environment (Wales) Act 2016, in addition to any species considered to be of significance for nature conservation such species listed in red data books, the Royal Society for the Protection of Birds (RSPB) 'Birds of Conservation Concern' lists and or Local Biodiversity Action Plans (LBAPs).

[14] https://www.cofnod.org.uk/Home

[15] https://jncc.gov.uk/

[16] https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity

[17] http://lle.gov.wales/home

[18] JNCC (2016). Handbook for Phase 1 habitat Survey: technique for environmental audit.

any features of interest, such as those that provide suitable habitat for protected species, or habitats that were too small to appear at the drawing's resolution.

Relevant species included all those protected by European or UK law, and notable species including those identified as being of principal importance in Wales, in response to Section 7 of the Environment (Wales) Act 2016 (Appendix A). A summary of the walkover objectives and methodology was as follows:

- Rapid visual inspection to identify structures and trees (from the ground only) that will require further survey to assess their suitability to support breeding, resting and hibernating bats, based on those outlined in the Bat Conservation Trust's Bat Surveys: Good Practice Guidelines Good Practice Guidelines[19];
- Outline the potential for habitats to support badger and carry out preliminary searches for signs of badger activity including setts, tracks, foraging holes and latrines[20];
- Outline the potential for habitats and watercourses to support otter and carry out preliminary searches for signs of otter[21];
- Outline the potential for habitats to support nesting birds (including any old nests);
- Outline the potential for habitats to support common species of reptiles; adder, (*Vipera berus*), grass snake (*Natrix helvetica*), slow worm (*Anguis fragilis*) and common lizard (*Zootoca vivipara*)[22];
- Outline the potential for habitats to support assemblages of notable invertebrates; and
- Searching for evidence of the presence of invasive plants listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), such as New Zealand pigmy weed (*Crassula Helmsii*) or Japanese knotweed (*Reynoutria japonica*) and The Invasive Alien Species (Enforcement and Permitting) Order 2019, which are subject to strict legal control, such as Himalayan balsam (*Impatiens glandulifera*).

Further details are provided in the PEA report in Appendix C.

3.2.2 Intertidal Biotope Survey

An Intertidal Biotope Survey was undertaken along the shore parallel with the proposed works by two experienced marine ecologists on 29 March 2022.

The survey was undertaken in accordance with the JNCC's Marine Nature Conservation Review (MNCR) Intermediate Level survey for rapid biotope assessment comprising broad biotope appraisal and identification of conspicuous flora and fauna. The survey was timed to target low water to maximise the extent of accessible intertidal habitat. The Intertidal Biotope Survey was undertaken either side of low water, which occurred at 14:25 BST at a tidal height of 0.92m Above Chart Datum.

The survey was undertaken in accordance with the JNCC's MNCR methodology, which was developed to provide a comprehensive baseline of information on marine habitats and species, to aid coastal zone and marine management and to contribute to the identification of areas of marine natural heritage importance throughout Great Britain.

In accordance with MNCR guidance an intermediate-level survey was considered appropriate to describe baseline conditions. This enabled a rapid assessment of habitats and conspicuous fauna, between Mean High Water Springs (MHWS) and Mean Low Water Springs (MLWS), in addition to physical characteristics of the site and potential modifiers. Core sampling, sieving and sediment size analysis was not considered necessary to inform this baseline assessment. Abundances are described according to the MNCR SACFOR

[19] Collins, J. (2016). Bat Surveys: Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed.). The Bat Conservation Trust, London.

[20] Harris, S., Cresswell, P. and Jefferies, D., 1989. Surveying Badgers. Mammal Society.

[21] Chanin, P. (2003). Monitoring the Otter, Lutra lutra. Conserving Natura 2000 Rivers Monitoring Series No. 10., English Nature, Peterborough.

[22] Gent, T. & Gibson, S. (2003). Herpetofauna Workers Manual. Joint Nature Conservation Committee, Peterborough.

scale, which in summary is as follows: Superabundant (>80%), Abundant (40-79%), Common (20-39%), Frequent (10-19%), Occasional (5-9%), Rare (1-5%) and Present (<1%).

Full details are provided in the Intertidal Biotope Report in Appendix D.

3.2.3 Protected Species Surveys

No further protected species surveys have been undertaken.

3.2.4 General Survey Limitations and Assumptions

The findings presented in this report represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys can be limited by factors affecting the presence of plants and animals, such as the time of year, migration patterns and behaviour. The Extended Phase 1 Habitat Survey was undertaken in February, which is beyond the optimal period for vegetation surveys (typically April to September) and, as such, some species and indicators may therefore have not been identified. In spite of this limitation, the survey is considered to deliver an adequate baseline appraisal of the ecological features present for the scheme, as when any uncertainty existed over the likely value or condition of the habitats present, the precautionary principle was applied to ensure that the features were not undervalued. This is not considered sufficiently significant to alter the outcomes or further recommendations described in this report.

The Intertidal Biotope survey was undertaken on 29 March 2022, while the recommended months for intertidal surveys are April to October; the survey was required to be completed just outside of this recommended window due to logistical constraints. Access to the full extent of the eulittoral to MLWS was not possible due to the tidal state; however, the majority of habitats were accessible at the time of survey. It is therefore considered that the biotopes and species identified are representative.

The results of the ecological survey allow evaluation of nature conservation value, assessment of the significance of potential impacts that may arise from the proposed development and consideration of appropriate mitigation measures. Every effort was made to ensure that the findings of the study present as accurate an interpretation as possible of the status of flora and fauna located within the redline boundary.

Any other specific survey assumptions and limitations are detailed within the PEA report and Intertidal Biotope Report.

In spite of the limitations outlined above, this report is considered to deliver an adequate baseline appraisal of the ecological resources for the assessment of impacts likely to arise from the scheme.

3.3 Assessment Methodology

The assessment of impacts from construction and operation has followed the methodology which is set out in the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland[23].

In line with this guidance, the following definitions are used for impacts and effects:

- Impact – Actions resulting in changes to an ecological resource. For example, the construction activities of a development removing a hedgerow.
- Effect – Outcome to an ecological resource from an impact. For example, the effects on a dormouse population from loss of a hedgerow.

3.3.1 Zone of Impact for Ecological Resources

All plant and animal species, habitats and integrated plant and animal communities that occur within the 'zone of impact' of the proposed development are defined as potential 'ecological resources'. The zone of impact for ecological resources varies, depending on the nature and behaviour of the resources, and the type of impact that may affect them. As a rule, in this report, the assessment of individual resources is considered for the whole of the site plus the distances listed in Table 2.

Table 2 Maximum Zone of Impact from Scheme Boundary for Ecological resources

Ecological Resources	Maximum Zone of Impact from the site Boundary
Statutory designated European sites (including faunal species included as part of the designation), e.g. SAC.	5 km
Statutory designated European sites for which bats are a qualifying feature	10 km
Statutory Nationally designated sites (including faunal species included as part of the designation), including SSSIs and National Nature Reserves (NNRs)	2 km
Non-statutory designated sites - LNRs and SINCs	2 km
Records of protected and or notable species	Up to 2 km
Protected and notable species / habitats	Within/adjacent to the site up to 1km
Non-native Invasive species	Within the site only

3.3.2 Valuing Ecological Resources

The CIEEM guidelines recommend that the value of ecological resources or features is determined based on a geographic frame of reference. For this assessment the following geographical frame is used:

- International;
- National (i.e. UK);
- Regional (i.e. North Wales);
- County (i.e. Gwynedd County);
- Local (i.e. within circa 5km); and
- Less than local (i.e. within the context of the proposed development and immediate vicinity).

[23] CIEEM. (2019). Guidelines For Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Available at: ECIA-Guidelines-Sept-2019.pdf (cieem.net)

3.3.3 Predicting and Characterising Ecological Impacts

CIEEM's guidelines advise to describe the following impacts in reference to;

- Positive or negative – an impact that either increases or reduces quality of the environment or factor being assessed;
- Magnitude - the size of an impact in quantitative terms where possible;
- Extent – the area over which an impact occurs;
- Duration – the time for which an impact is expected to last;
- Reversibility – a permanent impact is one that is irreversible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A temporary impact is one from which a spontaneous recovery is possible; and
- Timing and frequency – whether impacts occur during critical life stages or seasons and how often impacts occur;

Both direct and indirect impacts were considered; direct ecological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ecological impacts are attributable to an action, but which affect ecological resources through impacts on an intermediary ecosystem, process or receptor, e.g. a pollution event reducing the food source for a species such as otter or water vole.

3.3.4 Significance Criteria

In accordance with the CIEEM guidelines, a significant impact, in ecological terms, is defined as 'an impact (whether negative or positive) on the integrity[24] of a defined site or ecosystem and/or the conservation status[25] of habitats or species within a given geographical area, including cumulative and in-combination impacts'. The integrity of a site is defined within TAN 5[26] as: "…*the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and / or the levels of populations of the species for which it was classified.*"

It is important to note however that in accordance with the CIEEM guidelines, the actual determination of whether an impact is ecologically significant is made irrespective of the value of the resource in question. In this respect the CIEEM methodology differs from some other approaches to EIA.

The value of a feature that will be significantly affected is used to determine the geographical scale at which the impact is significant, e.g. an ecologically significant impact on a feature of county importance will be considered to represent a significant impact at a county level. This in turn is used to determine the implications in terms of legislation, policy and /or development management.

The assessment relies on professional judgement and guidance as provided within CIEEM Guidelines.

Any significant impacts remaining after mitigation (the residual effects), together with an assessment of the likelihood of success of the mitigation, are the factors to be considered against legislation, policy and development management in determining the application.

[24] Integrity is the coherence of ecological structure and function, across a site's whole area that enables it to sustain a habitat, complex of habitats and/or the levels of populations of species.

[25] Conservation status for habitats is determined by the sum of the influences acting on the habitat and its typical species that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area. Conservation status for species is determined by the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area.

[26] Welsh Government (2009) Technical Advice Note 5: Nature Conservation and Planning. Cardiff

3.3.5 Mitigation and Enhancement

It is important as part of any environmental impact assessment, wherever possible, to clearly differentiate between mitigation and enhancement. These terms are used in this assessment as follows:

- Mitigation is used to refer to measures to avoid, reduce or remedy a specific negative impact in situ; and
- Enhancement is used to refer to measures that would result in positive ecological impacts, but which do not relate to specific significant negative impacts or where measures are required to ensure legal compliance.

3.3.6 Ecosystem Resilience Assessment

At this stage, an assessment of ecosystem resilience has not been undertaken. This will need to be undertaken if this EcIA is required to support a full planning application.

4. Baseline Conditions

4.1 Statutory and Non-Statutory Designated Sites

4.1.1 Statutory designated sites

A total of four internationally designated statutory sites were identified within 5km of the proposed works, including Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). One internationally designated statutory site was identified within 10km with bats as a qualifying feature; the Meirionnydd Oakwoods and Bat Sites SAC located at 50m from the Site. A total of two nationally designated statutory sites were identified within 2km of the proposed works; Mawddach Estuary Site of Special Scientific Interest (SSSI) and Barmouth Hillside SSSI.

Details of the internationally and nationally designated sites for nature conservation identified during the desk study are shown in Table 3 and locations displayed in Figure 2.

Table 3 Statutory designated wildlife sites within 5km (international sites), 2km (national sites) and 10km (bat sites) of the site

Site Name	Description	Distance and orientation from site
Internationally designated statutory sites		
Lleyn Peninsula and the Sarnau SAC	This site is primarily designated for: • Sandbanks which are slightly covered by sea water all the time; • Estuaries, including the Glaslyn/Dwyryd, Mawddach and Dyfi estuaries. The intertidal sandflats support communities of burrowing invertebrates, including dense populations of polychaete worms (such as *Levinsenis gracilis*), crustaceans (such as *Eudorella truncata*), bivalve molluscs (such as *Mysella bidentata*) and gastropod molluscs (such as *Otina ovata*); • Saltmarsh fringing the shores of the estuaries, and the saltmarsh creeks and pools, are important habitat features for juvenile fish; • Coastal lagoon Morfa Gwyllt is a small percolation lagoon that consists of a depression in a shingle bar across the mouth of the Afon Dysynni in mid Wales. This is the only example of a percolation lagoon in Wales. Three lagoonal specialists have been found at this site: an amphipod (*Sphaeroma hookeri*), a bryozoan (*Conopeum seurati*) and an alga (*Chaetomorpha linum*); • Large shallow inlets and bays, such as the seabed of Tremadog Bay on the south side of the Lleyn Peninsula, consisting of a mosaic of different sediment types. Algal species (*Naccaria wiggii and Scinaia spp.*) are present. Burrowing animals, including bivalves, crabs, brittlestars, urchins and worms, dominate the muddier sediments. Beds of eelgrass (*Zostera angustifolia*) and muddy gravel shores. Gravelly beach supports a nationally rare amphipod (*Pectenogammarus planicrurus*). Several unusual species include bearded red seaweed (*Anotrichium barbatum*) and a mantis shrimp (*Rissoides desmaresti*); • Reefs encompassing a varied range of reef habitats, including submerged and intertidal glacial moraines. There are distinctive communities on bedrock and boulders, ranging from sites exposed to very strong wave action and/or tidal streams to sites sheltered from strong water movement. Algal communities are dominant over much of the reefs, with growths of foliose red and brown algae forming very dense beds in many places, in the absence of shading from kelp. Two brown algae species (*Chorda filum and Laminaria saccharina*) and red algae flourish on or near the reef crest, the number of algae species on pebbles increases with depth. In certain areas there are extensive forests of sea-oak (*Halidrys siliquosa*).	On site.

Site Name	Description	Distance and orientation from site
	Rich animal-dominated biotopes are found in the deeper parts of the reefs, including crustaceans, cnidarians, sponges, hydroids and encrusting bryozoans. • Glasswort (*Salicornia sp*.) and other annuals colonising mud and sand; • Otter, grey seals (*Halichoerus grypus*) and bottlenose dolphins (*Tursiops truncates*) are present.	
Meirionnydd Oakwoods and Bat Sites SAC	The site is primarily designated for its old sessile oak (*Quercus petraea*) woods with genus Ilex and genus Blechnum in the British Isles, alluvial forests with alder (*Alnus glutinosa*) and ash (*Fraxinus excelsior*) (*Alno-Padion, Alnion incanae, Salicion albae*), and lesser horseshoe bat populations which includes the majority of known maternity roosts in Meirionnydd and several hibernacula.	50m north at closest approach.
Northern Cardigan Bay SPA	Over winter: Red-throated diver (*Gavia stellata*), 1,186 individuals representing 7% of the wintering population in Great Britain (2001/02 – 2003/04)	3.5km west, hydrologically connected via Mawddach Estuary and west towards Barmouth Bay.
Cadair Idris SAC	Oligotrophic to mesotrophic standing waters, with clear-water lakes with aquatic vegetation and poor to moderate nutrient levels. Contains siliceous scree with parsley fern (*Cryptogramma crispa*) and wavy hair grass (*Deschampsia flexuosa*) NVC community present. Calcareous and siliceous rock slopes with chasmophytic vegetation are also important for this site, including *Cryptogramma crispa – Deschampsia flexuosa* NVC community present in some places. Marsh fritillary butterfly and slender green feather-moss (*Drepanocladus vernicosus*).	4.3km south-east at closest approach.
Nationally designated statutory sites		
Mawddach Estuary SSSI	Designated for its biological features, including the estuary itself, a large shallow estuary which drains south-west into Cardigan Bay, and a series of adjacent habitats. The overall management objective for the SSSI is to retain the habitat- and species-related interest of the area.	On site.
Barmouth Hillside SSSI	Situated on the slopes immediately north of Barmouth town, containing an area of rare wind-pruned oak woodland. This site also contains disused quarries, mine workings and spoil tips as a legacy of previous slate mining activity. Species in ground flora include bluebell (*Hyacinthoides non-scripta*) and wood sage (*Teucrium scorodonia*). Localised nutrient enrichment due to the presence of manganese shales results in more lush flora including Ramsons (*Allium ursinum*) and Cuckoo-pint (*Arum maculatum*) with ash often abundant.	20m north-east at closest approach.

4.1.2 Non-statutory designated sites

There are 11 Sites of Nature Conservation (SINCs) located within 2km of the site, these are detailed in Table 4 displayed in Figure 2. There are two AWI sites within 500m. No veteran trees have been recorded within 500m of the site, however, two trees of notable status have been recorded approximately 465m northwest of the site, comprising Monterey cypress (*Hesperocyparis macrocarpa*) trees.

Table 4 Non-statutory designated wildlife sites within 2km of the site, and AWI site within 500m of the site

Site Name	Description	Distance and orientation from the site
Dinas Oleu SINC	Habitat includes dry dwarf shrub heath	78m north

Site Name	Description	Distance and orientation from the site
Garn SINC	Habitat includes dry heath/acid grassland mosaic; acid grassland	0.2km east at closest approach
Orielton Wood SINC	Habitat includes broadleaved woodland; dry dwarf shrub heath	0.5km east
Wern Mynach SINC	Habitat includes wet woodland; marshy grassland.	1.0km north west
Fegla Fawr Saltings SINC	Grazed saltings of grass (*Puccinellia Festuca*) with some open mud and channels. *Carex punctata* and *Eleocharis quinqueflora* occur with lichen flora, *Anagallis minima* and *Radiola linoides* on slopes at east edge dependent upon maritime conditions.	1.1km south east
Ffridd y Graig & south to Garn SINC	Habitat includes acid grassland; dry dwarf shrub heath	1.2km north
Coed Glan y Mawddach SINC	Habitat includes woodland - mixed, many exotic spp	1.4km north east
Fegla Fawr Hill SINC	Heavily grazed rocky lowland (coastal) grassland. Oak woodland with a wide range of flowering plants, lichens bryophytes. Includes *Euonymus europaeus* and *Ophioglossum azoricum*, latter at SH62921490 to SH63001490 (now in SSSI)	1.5km north east
Ceilwart-ganol SINC	Habitat includes acid grassland; bracken	1.5km north west
Llwyn-on SINC	Peatlands. Basin mire of *Erica/ Eriophorum* with some sphagnum and *Juncus acutiflorus*	1.8km north east
Barmouth Junction Railway SINC	Disused railway line. *Foeniculum vulgare, Heracleum sphondylium, Hypericum perforatum, Lathyrus sylvestris, Lathyrus pratensis* and *Ononis repens* on railway ballast	1.9km south east
Ancient Woodland 25273	Restored Ancient Woodland Site	0.5km east
Ancient Woodland 24006	Ancient Semi Natural Woodland	0.5km east

4.1.3 Habitats of Principal Importance

Several of the habitats within and adjacent (within 1km) to the study area are likely to be considered habitats of principal importance for the conservation of biodiversity as listed on Section 7 of the Environment (Wales) Act (2016). These are summarised below:

- Saline lagoon at Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC;
- Intertidal mudflats within Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC;
- Sheltered muddy gravels within Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC;
- Coastal grazing marsh surrounding Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC;
- Subtidal sandbanks present in Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC;
- Honeycomb worm (*Sabellaria alveolata*) reefs within Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC;
- Reedbeds within Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC;

- Upland oak woodland at Meirionnydd Oakwoods and Bat Sites SAC;
- Inland rock outcrop and scree habitat at of Barmouth Hillside SSSI and Dinas Oleu SINC;
- Coastal saltmarsh present in Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC, adjacent to Barmouth Bridge and Fairbourne Spit;
- Coastal sand dunes situated south at Fairbourne Spit;
- Estuarine rocky habitats situated at south-west Barmouth and Fairbourne Spit; and
- Dry heath/acid grassland mosaic at Barmouth Hillside SSSI.

The following habitats are listed under Environment (Wales) Act Section 7 and OSPAR: Marine Habitats - Section 7:

- Estuarine rock 100m west of the study area
- Blue Mussel Beds 100m west of the study area.
- Intertidal mudflats 400m west of the study area.

These habitats of principal importance for conservation are protected under Planning Policy Wales 2021[27] Appendix A.

4.1.4 Water Framework Directive (WFD)

The Study Area is recorded as WFD Lower Sensitivity Habitats:

- Rocky shore (Intertidal rock).
- Intertidal Soft Sediment (Sand, Mud & Mixed).

WFD Higher sensitivity habitat, Mussel Beds (*Modiolus modiolus*, *Mytilus edulis* & others) is present approximately 100m east and 400m southwest of study area. WFD Higher sensitivity habitat, Saltmarsh is present approximately 500m south of the study area. No further higher sensitivity WFD habitats are recorded on the MAGIC website.

4.2 Phase 1 Habitat Survey

Habitats within the survey area are described below. These should be read in conjunction with the Extended Phase 1 Habitat Survey Plan and associated target notes (Figure 3). The habitats are listed in the order found in the JNCC's Phase 1 Handbook. For further details of the habitats refer to the PEA in Appendix C, along with the target notes. Note that the Intertidal Biotope Survey in Section 4.3 provides more detail on the intertidal habitats listed below.

4.2.1 A2.2 Scattered scrub

Scattered scrub is present within the church courtyard within the north-west of the Site, comprising rose (*Rosa* sp.) shrubs.

4.2.2 A 3.1 Broadleaved parkland/scattered trees

Broadleaved parkland trees are scattered within the Viaduct Gardens area, comprising entirely of cherry (*Prunus* sp.). Four cherry trees are scattered surrounding the border of the church courtyard.

4.2.3 A3.2 Coniferous parkland/scattered trees

Coniferous parkland trees are scattered within the Viaduct Gardens area, comprising western red cedar (*Thuja plicata*).

[27] Welsh Government Planning Policy Wales Edition 11. February 2021. Planning Policy Wales - Edition 11 (gov.wales)

4.2.4 H1.1 Intertidal mud/sand

There is a mosaic of intertidal habitat present within the northern aspect of the coastal area, between the south-facing sea wall and the north-facing slipway. A strip of intertidal bare sand is present within the Mawddach Estuary underneath Barmouth Bridge and on the south aspect of the Barmouth Bridge. Bare sand is present adjacent to the north-facing slipway and extends north towards the Barmouth Bridge, parallel with the iron fencing.

Intertidal bare sand is the only intertidal habitat present within the southern aspect of the site. This habitat is adjacent to the seawall and extends from the north-facing slipway southwards to the south-facing slipway. The tide within the southern aspect of the site was above the coastal substrate level, therefore was surveyed from above the seawall, looking through the depth of the tide at the substrate below.

4.2.5 H1.1.3 Intertidal mud/sand with brown algal beds

Intertidal sand with sparse brown algal beds is present within the mosaic intertidal habitat that is situated in the northern area of the coastal habitat, between the south-facing sea wall and the north-facing slipway. It is grouped in two areas. A strip of this habitat is present adjacent to the east-facing seawall, on the north aspect of the north-facing slipway. It is adjacent to an area of intertidal boulders/rocks that have become established by brown algal beds Species present include egg wrack (*Ascophyllum nodosum*), bladder wrack (*Fucus vesiculosus*) and spiral wrack *(Fucus spiralis*).

4.2.6 H1.2 Intertidal shingles/cobbles

Intertidal shingle habitat is within the mosaic intertidal habitat that is situated in the northern area of the coastal habitat, between the south-facing sea wall and the north-facing slipway. It is present underneath the Barmouth Bridge, extending slightly south into the coastal area and stretching west parallel with the bridge. It is adjacent to artificial sea wall, which is present on its north and east aspect.

4.2.7 H1.2.2 Intertidal shingles/cobbles with green algal beds

Intertidal shingles with green algal beds are present in a small area within the mosaic intertidal habitat that is situated in the northern area of the coastal habitat. Species present include sea lettuce (*Ulva* sp).

4.2.8 H1.3 Intertidal boulders/rocks

Intertidal boulders and rocks are present within the mosaic intertidal habitat that is situated in the northern area of the coastal habitat, between the south-facing sea wall and the north-facing slipway. Boulders are present underneath the west aspect of the Barmouth Bridge and adjacent to the south-facing sea wall.

4.2.9 H1.3.3 Intertidal boulders/rocks with brown algal beds

Intertidal rocks with brown algal beds are present within the mosaic intertidal habitat that is situated in the northern area of the coastal habitat, between the south-facing sea wall and the north-facing slipway. The rocks extend from the east side of the Barmouth Bridge south-eastwards to the site boundary. Species present include egg wrack, bladder wrack and spiral wrack.

4.2.10 I1.4 Other exposure

Rock exposure that has become colonised by vegetation, situated between Barmouth Sailors' Institute and Barmouth Bridge. Species present include willow (*Salix* spp.), ivy-leaved toadflax (*Cymbalaria muralis*), maidenhair spleenwort (*Asplenium trichomanes*), ivy (*Hedera* spp.), ribwort plantain (*Plantago lanceolata*), common dandelion (*Taraxacum officinale*), red valerian (*Centranthus ruber*) and cock's-foot (*Dactylis glomerata*).

4.2.11 J1.2 Amenity grassland

Amenity grassland is present within the Viaduct Gardens area and within the church courtyard. A mixture of species are present within these areas, including perennial ryegrass (*Lolium perenne*), common chickweed (*Stellaria media*), common daisy (*Bellis perennis*), ribwort plantain, common dandelion, forget-me-not (*Myosotis* spp.), bittercress (*Cardamine* spp.), rough hawkbit (*Leontodon hispidus*), and common yarrow (*Achillea millefolium*). Species present within margins included crane's-bill (*Geranium* spp.), lesser celandine (*Ficaria verna*), bramble (*Rubus* spp)., common daisy and white clover (*Trifolium repens*).

4.2.12 J1.4 Introduced shrub

Non-native shrubs have been planted for ornamental purposes within the Viaduct Gardens area to border the grassland area. Species present included *Phormium* spp., *Viburnum* spp. and family Cupressaceae.

4.2.13 J2.4 Fence

Iron fencing borders the Viaduct Gardens area, segregating it from the concrete path and road. Wooden fencing is present within the Viaduct Gardens area to form a bin store.

Iron fencing is present as a boundary between the promenade and the seawall edge, stretching along the south-west perimeter of the promenade.

Fencing is present within the church courtyard, segregating the courtyard on the south-east aspect of the church from the grassland on the north-east aspect of the church.

4.2.14 J2.5 Wall

A wall is present around the perimeter of the church gardens and borders the courtyards of residential houses and shops. Species identified growing on the wall included common polypody (*Polypodium vulgare*), maidenhair spleenwort, common sowthistle (*Sonchus oleraceus*), herb Robert (*Geranium robertianum*), self-heal (*Prunella vulgaris*), mosses (*Bryophyta sp*.) and ivy-leaved toadflax.

A wall is present behind buildings on the west aspect of the Quay, forming a barrier between the building's rear open space and public access. There is an inclined pathway on the west aspect of the wall that leads to residential housing and a hotel.

4.2.15 J3.5 Artificial sea wall

The seawall is present on the south-east aspect of the site, bordering where the land meets the coast. It extends from Frontage 1 southwards along Frontage 2. It is of masonry composite.

4.2.16 J3.6 Buildings

A range of residential, commercial, worship and leisure activity buildings are found within 50m of the site.

4.3 Intertidal Biotope survey

The study area of the intertidal biotope survey consisted of the intertidal area immediately seawards of the seawalls along Frontage 1 and Frontage 2 from MHWS to MLWS (refer to Figure 1ab). Results of the survey have been summarised below. Species zonation, distribution and abundance varied throughout the Study Area. The key biotopes have been identified in Table 5 below. Refer to the Intertidal Biotope Survey report in Appendix F for full details.

Only one incident of marine INNS, *Austrominius modestus* (Darwin's barnacle) (Grid Ref: 52.719626, -4.0506721), was recorded during the survey. Incidental observations included several stranded *Cyanea lamarkii* (blue jellyfish) and one individual of *Liocarcinus marmoreus* (marbled swimming crab). Evidence of *Scrobicularia plana* feeding (star-patterns in sediment) observed on eulittoral sand, in addition to bird feeding remains of *S. plana*, *Cerastoderma* edule (edible cockle) [O] and *Macoma balthica* (Baltic tellin) shells and casts of *Lanice conchilega* (sand mason worm) [O] and *Arenicola marina* (lugworm) [C]. Two cormorants (*Phalacrocorax carbo*), two oystercatchers (*Haematopus ostralegus*), two terns (*Sterna sp.*) and c. 30 herring gull (*Larus argentatus*) were also observed foraging and resting across the estuary. Also of note is that most species were large mature specimens (notably *Patella vulgata* and *Ligia oceanica*) suggesting a healthy habitat. A sign is present on the harbour warning residents and visitors of potential *Echiichthys vipera* (lesser weever fish) presence in the area.

4.3.1 Frontage 1

For the purpose of the intertidal report, the intertidal area of Frontage 1 consists of the area directly seawards of the Viaduct Gardens public space and seawall. The characteristics of the habitat here resemble predominant areas of intertidal bare sand with patchy areas of shingle and cobbles. The rock armour and viaduct pillars have been colonised by sparse lichen and patches of green alga. Lower down on the shore, small intertidal rocks and boulders are present, colonised by brown and green algae.

A relatively broad range of commonly occurring species were observed; including the following, SACFOR abundance denoted as [#]:

- Algae - Chlorophyta (green seaweeds): *Ulva enteromorpha* [O] (gutweed).
- Algae - Ochrophyta: Phaeophyceae (brown seaweeds): *Fucus spiralis* [C] (spiral wrack), *Pelvetia canaliculata* [C] (channelled wrack), *Fucus vesiculosus* (bladderwrack) [C], *Fucus ceranoides* (horned wrack) [O], *Ascophyllum nodosum* [O] (knotted wrack).
- Crustacea - *Semibalanus balanus* [A] (acorn barnacle), *Austrominius modestus* [R] (Darwin's barnacle – Invasive Non-Native Species).
- Chordata: Pisces: Osteichthyes (fish) – *Lipophrys pholis* [P] (shanny), *Pholis gunnellus* [P] (butterfish).
- Mollusca - *Littorina littorea* [C] (common periwinkle).

4.3.2 Frontage 2

For the purpose of the intertidal report, the intertidal area of Frontage 2 consists of the section in-between Frontage 1 and the Quay (see Figure 1ab) characterised by a seawall and north-facing slipway, with sheet piles installed at the toe of the wall at the northern end and the section in front of the Quay. The section in front of the Quay is characterised by slate stone walls, colonised by common algae species (see list below) and sand. Intertidal sand is the predominant habitat within frontage 2.

A relatively broad range of commonly occurring species were observed, including the following, SACFOR abundance denoted as [#]:

- Algae – Chlorophyta (green seaweeds): *Ulva enteromorpha* [C] (gutweed).
- Algae – Ochrophyta: Phaeophyceae (brown seaweeds): *Fucus vesiculosus* [F] (bladder wrack), *Fucusspiralis* [O] (spiral wrack), *Ascophyllum nodosum* [A] (knotted wrack).
- Algae – Rhodophyta (red seaweeds): *Chondrus crispus* (carrageen) [O], *Polysiphonia lanosa* (epiphytic), *indet. filamentous sp*. [*O*], *Rhodothamniella floridula* (sand-binding filamentous red algae) [O].
- Cnidaria – *Actinia equina* [R] (beadlet anemone).
- Crustacea - *Ligia oceanica* [O] (common sea slater), *Carcinus maenas* [O] (common shore crab), *Palaemon* sp. (prawn) [O], *Semibalanus balanus* [A] (acorn barnacle), *Austrominius modestus* [O] (Darwin's barnacle – Invasive Non-Native Species).
- Mollusca - *Littorina littorea* [C] (common periwinkle), *Littorina saxatilis* [F] (rough periwinkle) *Littorina obtusata* [C] (flat periwinkle), *Melarhaphe neritoides* [O] (Small periwinkle), *Steromphala (Gibbula) umbilicalis* [F] (flat top shell), *Steromphala cineraria* [O] (grey top shell), *Patella depressa* [C] (blackfooted limpet), *Patella vulgata* [C] (common limpet), *Mytilus edulis* [R] (common mussel), *Cerastoderma edule* [R] common cockle.
- Porifera: *Porifera sp*.[O] (orange sponge).

Table 5 Intertidal Biotopes Recorded

Zonation	Biotope Code	Biotope	Locality
Supralittoral Fringe	LR.FLR.Lic.YG	Yellow and grey lichens on supralittoral rock	Frontage 1 seawall, rock armour and viaduct pillars
Supralittoral Fringe	LS.LCS.Sh	Shingle (pebble) and gravel shores	Frontage 1 area beneath viaduct
Upper Littoral Fringe	LS.LCS.Sh.BarSh	Barren littoral shingle	Frontage 1 area beneath viaduct

Lower Littoral Fringe	LS.LSa.Mo.Sa.BarSa	Barren Littoral Coarse Sand	Sandy areas throughout Frontage 1 Sandy areas throughout Frontage 2 adjacent to seawalls
Lower Littoral Fringe	LR.MLR.BF.PelB	*Pelvetia canaliculata* and barnacles on moderately exposed littoral fringe rock	Frontage 1 area beneath viaduct Frontage 2 seawall
Upper- / Mid-Eulittoral	LR.LLR.F.Asc.X	*Ascophyllum nodosum* on full salinity mid eulittoral mixed substrata	Frontage 1 rocky shore southwards of viaduct Frontage 2 seawall
Mid-Eulittoral	LR.LLR.F.Fspi	*Fucus spiralis* on moderately exposed to very sheltered upper eulittoral rock	Frontage 1 rocky shore southwards of viaduct
Mid-Eulittoral	LR.LLR.F.Fves.X	*Fucus vesiculosus* on mid-eulittoral mixed substrata	Frontage 2 seawall
Mid-Eulittoral	LR.HLR.MusB.Sem.FvesR	*Semibalanus balanoides*, *Fucus vesiculosus* and red seaweeds on exposed to moderately exposed eulittoral rock	Frontage 2 seawall

4.4 Protected and Notable Species

The results of the desk study and field surveys have been combined under the relevant headings below. Records of protected and notable species within 2.0km of the proposed Scheme at Viaduct Gardens, Barmouth are listed below. All records below were observed between 2012-2022. Species-specific legislation is outlined in A.1.2. Records of bat roosts and badgers are sensitive and should be treated as confidential.

4.4.1 Mammals

4.4.1.1 Bats

Desk study

Bat species recorded during the last ten years within 2.0km of the site comprise common pipistrelle and lesser horseshoe bat. A common pipistrelle was recorded foraging approximately 0.2km north-west of the site at the Lion Hotel, Barmouth. Three lesser horseshoe bat roosts have been recorded, the closest record being that of a hibernation roost situated 1.5km north-east of the Site, near Panorama Walk.

Field survey

During the Extended Phase 1 Habitat survey, a rapid visual inspection of trees and buildings was carried out to identify whether further surveys would be required in order to assess the roosting potential of trees and buildings surrounding the Site. There were no trees within 50m of the site that had potential to support roosting bats. The sea wall on site and Barmouth bridge adjacent to the site were inspected for potential roost features, however any gaps present were found to be exposed and damp and as such these structures are considered to be of negligible suitability for roosting bats.

At least three buildings within 50m, including St David's Church, a public toilet block and residential housing, were noted to hold potential roost features that could support bats (noting that access to private/residential properties was not sought). The suitability of these buildings to support roosting bats however is reduced due to the urban nature of their surrounds, with only occasional scattered trees along the Promenade and high levels of street lighting present. As such, it is considered unlikely that the buildings on or adjacent to the site would support any significant numbers of lesser horseshoe bats, as associated with the

nearby Meirionnydd Oakwoods and Bat Sites SAC, as they are known to prefer sheltered flightlines[28] with gaps of 10m observed to prevent movement along flightlines[29]. Nonetheless, common and widespread bat species (e.g. common pipistrelle) which are adapted to urban conditions may be present within these buildings, including during the hibernation period, and as such these could be of up to moderate conservation significance[30].

Exposed rock and cliff face habitat situated within 50m north of the site also has potential to support roosting bats in voids or crevices such as cracks, breaks and flakes[31]. Lesser horseshoe bat roosts (as per the SAC designation) are not typically associated with rock faces[32]; however, datasets on the use of rock faces by bats are currently limited and therefore, on a precautionary basis, it is assumed that lesser horseshoe bats could use these features if significant voids are present along with more common and widespread species present in the area. Suitable foraging habitat is also present within surrounding designated sites, including areas of scrub present on the rock face and scrub and trees present within 50m north-east of the Site.

4.4.1.2 Riparian mammals

Desk study

No records of water vole were returned within 2.0km of the Site. A total of three records of otter were found within 2.0km of the Site. The closest record is a sighting of a foraging otter approximately 0.4km south of the site at Barmouth Breakwater, Gwynedd. Other evidence of otter includes spraints, footprints and feeding remains. It is important to note that Cofnod returned records of breeding populations within 2.0km of the site prior to the year 2012 where one adult female was observed with two pups, and on a separate occasion a lactating female was recorded. The nearby Orielton Wood may be suitable for holts and other resting sites. Reedbeds within Mawddach Estuary are suitable for resting and breeding sites for otter.

Field survey

During the Extended Phase 1 Habitat Survey, no evidence of otter or water vole was found. Suitable habitat for otter is present within 50m of the Site, including shallow, inshore marine areas for feeding and the open, low-lying coast, with a connected river Afon Mwaddach for commuting. Whilst carrying out the Extended Phase 1 Habitat Survey, a conversation with a local resident informed that an otter was observed on the promenade in the southern area of the site in 2017. Otter surveys have been completed by Ymgynghoriaeth Gwynedd Consultancy (YCG) since the Phase 1 Survey and no resting places, holts or otter signs were reported (per. comms from YCG).

No suitable habitat for water vole was recorded within 50m of the Site. As such, the lack of suitable habitat paired with the lack of records deem this species unlikely to be present and will not be considered for the remainder of this assessment.

[28] Billington, G., Rawlinson, M.D. 2006. A Review of horseshoe bat flight lines and foraging areas. CCW Science Report No: 755, 23pp, CCW, Bangor.

[29] Schofield, H., Messenger, J., Birks, J. & Jermyn, D. 2002. Foraging and Roosting Behaviour of Lesser Horseshoe Bats at Ciliau, Radnor. Ledbury: The Vincent Wildlife Trust; Brinkmann, R., Bach L, Biedermann, M., Dietz, M., Dense, C., Fiedler, W., Fuhrmann, M., Kiefer, A., Limpens, H., Niermann, I., Schorcht, W., Rahmel, U., Reiter, G., Simon, M., Steck, C. & Zahn, A. 2003. Crossing Points for Bats – limiting damage in habitat fragmentation by transport projects. Position Paper of the Wildlife Crossing Points Working Party. www.buerobrinkmann.de 30 Downs, N. C., C

[30] Mitchell-Jones, A.J. 2004. Bat mitigation guidelines. English Nature.

[31] Bat Rock Habitat Key, 2021. *Bats Roost in Rock – A Guide to Identification and Assessment for Climbers, Cavers & Ecology professionals*. Pelagic Publishing, Exeter.

[32] Andrews, H. 2021. Bat roosts in rock: A guide to identification and assessment for climbers, cavers & ecology professionals. Though it should be noted that there is a limited dataset, no horseshoe bats have been reported within the database within rock faces.

4.4.1.3 Badger

Desk study

A single badger (*Meles meles*) record was found within 2.0km of the site. The live badger was observed approximately 1.0km north-west of the site on the A496 roadside.

Field survey

During the Extended Phase 1 Habitat Survey, no evidence of badger or was recorded within 50m of the Site. Suitable foraging habitat may be present within residential and public gardens, such as St David's Church courtyard and Viaduct Gardens. Although suitable soil for sett creation is present within 50m of the Site, there is a low amount of hedgerow and woodland cover within these areas and is situated adjacent to residential housing, a footpath, and the A496. Due to likely disturbance in these areas, it is unlikely badger setts will be created within the survey area.

4.4.1.4 Marine Mammals

Desk study

No evidence of bottlenose dolphin or grey seal has been recorded within 2.0km of the Site, however both species are qualifying features of the Lleyn Peninsula and the Sarnau SAC.

Field survey

No bottlenose dolphin or grey seal were recorded during the field survey. Suitable habitat is present in the vicinity of the site in the form of the marine and estuarine environment, along with sandbars and rocky outcrops, however due to the current level of disturbance at the site itself, it is unlikely that either species would be present or come so close to shore in this area.

4.4.1.5 Dormouse and other notable mammal species

Desk study

Species listed under Section 7 Environment (Wales) Act 2016 have been recorded within 2.0km of the site within the last 10 years. Eight records of hedgehog (*Erinaceus europaeus*) were found within 2.0km of the Site. The closest record is a live sighting within the site boundary, near St David's Church. One record of brown hare (*Leus europaeus*) was found approximately 1.0km north of the Site, within a field. Five records of polecat was found approximately 0.2km north of the Site, within Dinas Oleu SINC.

No dormouse records were returned in the search area.

Field survey

No evidence of notable species was recorded during the Extended Phase 1 Habitat survey. Suitable habitat within 50m of the site includes gardens within urban areas that may be used by foraging hedgehogs and may provide opportunity for breeding, resting and hibernation.

No records of dormice were returned, this species is considered rare within the region[33] and there is insufficient suitable habitat for dormouse to be present, therefore, dormice will not be considered for the remainder of this assessment.

[33] https://ptes.org/campaigns/dormice/about-hazel-dormice/hazel-dormice-range-and-distribution-in-the-uk/

4.4.2 Birds

Desk study

Records of 611 birds were returned within 2.0km of the Site, comprising 104 species. The following WCA Schedule 1 species were included[34]:

- Peregrine (*Falco peregrinus*);
- Red kite (*Milvus milvus*);
- Whimbrel (*Numenius phaeopus*);
- Chough;
- Barn owl;
- Great northern diver (*Gavia immer*);
- Osprey (*Pandion haliaetus*);
- Whooper swan* (*Cygnus cgnus*);
- Brambling* (*Fringilla monitifringilla*);
- Black redstart (*Phoenicurus ochruros*);
- Redwing* (*Turdus iliacus*);
- Common scoter (*Melanitta nigra*);
- Mediterranean gull (*Ichthyaetus melanocephalus*); and
- Cetti's warbler (*Cettia cetti*).

The closest record was that of chough, where their presence has been recorded at Barmouth Hillside SSSI adjacent to the Site.

Records of 324 birds listed within Birds of Conservation Concern (BoCC)[35,36] are present within 2.0km of the site comprising 25 species of Red (R) and 35 species of Amber (A) status. Species of particular concern within this list include wading bird species bar-tailed godwit (*Limosa lapponica*) (R), curlew (*Numenius arquata*) (R), lapwing (R), ringed plover (*Charadrius hiaticula*) (R) and overwintering wading species whimbrel (A) and common redshank (*Tringa totanus*) (R). Llyn Peninsula and the Sarnau SAC and Mawddach Estuary SSSI provide suitable habitat for these birds. Additionally, Barmouth Hillside SSSI supports chough (A) throughout the year and has visitors throughout the year including pied flycatcher (*Ficedula hypoleuca*) (R), black redstart (*Phoenicurus ochruros*) (A) and wood warbler (*Phylloscopus sibilatrix*) (R).

Ordnance Survey mapping shows that mean high water extends all the way up to the existing sea wall at the site location, making it unsuitable for ground nesting birds.

Field survey

Woodpigeon (*Columba palumbus*) was observed nesting on Barmouth Bridge within Viaduct Gardens area, on the south-facing side of the bridge. Suitable habitat within 50m of the site for nesting and/ or foraging

[34] Although records of Schedule 1 birds are present within 2.0km of the survey area, it is unlikely for some of these species to breed within 50m of the survey area due to availability of suitable habitat. Schedule 1 species unlikely to breed within the survey area are marked with an asterix (*).

[35] Stanbury, A., Eaton, M., Aebischer, N., Blamer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D. & Win, I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds*, 114: pp.723-747.

[36] Johnstone, I. & Bladwell, S. (2016). Birds of Conservation Concern in Wales 3: the population of birds in Wales. *Birds in Wales*, 13: pp.3-11.

wading, breeding and/ or overwintering birds includes areas within Mawddach Estuary SSSI, sand dunes, sandflats, rocky shores, cliff edges and crevices of rock faces, clusters of trees, scrub and bare ground.

4.4.3 Herpetofauna

Desk study

Four records of common lizard (*Zootoca vivipara*) were returned within 2.0km of the Site. The closest record was found 0.1km north of the site on a private garden wall. A single record of adder was returned within 2.0km of the site. The adder was a juvenile female found on a footpath of Dinas Oleu SINC.

No records of amphibians, including great crested newt (*Triturus cristatus*), were returned within 2.0km of the Site. The only standing waterbody present within 2.0km of the site was situated 1.8km south of the Site, within a field that may sometimes be dry. This waterbody is situated across the Mawddach Estuary and Barmouth Bridge. It is unlikely to contain great crested newts and unlikely to be impacted by the proposed works, therefore does not require further survey. It is unlikely that great crested newts are present within the survey area and have been descoped for the remainder of the report. Furthermore, GCN are generally absent from this region of Wales, although some sightings have been recorded at Llanbedr 11.7km north[37].

Field survey

No evidence of reptiles or amphibians was recorded during the Extended Phase 1 Habitat survey, although it is noted that the survey was undertaken outside of the optimal time of year for herpetofaunal surveys. Habitats within 50m of the site including cliff, exposed rock, gardens, sand, walls and scrub provide suitable foraging and basking habitat for reptiles including common lizard and adder. No suitable amphibian habitat was recorded during the Phase 1 Habitat survey. Amphibians are considered unlikely to be present within the site and no records were returned within the search area, therefore, amphibians will be descoped from the remainder of this assessment.

4.4.4 Fish

Desk study

No fish were recorded as present within 2.0km of the site during the last ten years.

Field survey

Common goby (*Pomatoschistus microps*) was recorded within the estuary during low-tide, underneath rocks within the intertidal habitat. The mosaic of habitat within the estuary provides opportunity for many species that thrive in intertidal habitat.

Shanny (*Lipophrys pholis*) and butterfish (*Pholis gunnellus*) were also recorded during the intertidal biotope survey (see 4.3).

4.4.5 Invertebrates

Desk study

The desk study returned records of 22 invertebrate species within 2.0km of the Site. A total of 36 records of invertebrates listed under Section 7 of the Environment (Wales) Act (2016) were found, comprising the species listed below:

Wall brown (*Lasiommata megera*) 0.5km north-east

Forester (*Adscita statices*) 1.9km north-west

[37] Review of the Current Conservation Status (CCS) of the Great Crested Newt in Wales, with specific references to its long-term prospects and within its stronghold in North East Wales. 2018. NRW and Amphibian and Reptile Conservation Trust, Report No. 259. https://cdn.naturalresources.wales/media/687859/eng-evidence-report-259-review-of-the-current-conservation-status-ccs-of-the-great-crested-newt-in-wales.pdf

Small pearl-bordered fritillary (*Boloria selene*) 0.2km north

Grayling (*Hipparchia Semele*) 0.6km north

Small heath (*Coenonympha pamphilus*) 0.2km north

The closest records of Section 7 invertebrates were located 0.2km north of the site within Dinas Oleu SINC.

Field survey

The mosaic of grassland, scrub, cliff, sand and intertidal habitats on site are considered to be suitable to support notable terrestrial and marine invertebrates, with good connectivity to the wider landscape. Marine invertebrates recorded on site during the intertidal biome survey have been detailed in section 4.3.

White-clawed crayfish (*Austropotamobius pallipes*) are not considered likely to be present within the estuarine habitats on site, due to suspected unfavourable brackish and saltwater environment and habitat substrate (bare mud/sand) and are rarely found in North West Wales and therefore descoped from the remainder of this assessment.

4.4.6 Protected flora

Desk study

Four records of bluebell, which is listed under Schedule 8 of WCA, were returned within 2.0km of the Site. The closest record is situated 0.9km south of the Site.

A single record of prickly saltwort (*Salsola kali subsp. kali*), listed under Section 7 of the Environment (Wales) Act (2016), was returned within 0.3km of the Site.

Field survey

No species of protected flora were recorded during the Extended Phase 1 Habitat survey. It is noted that the survey was undertaken outside of the optimal time of year for vegetation surveys and so a full vegetative survey was not undertaken. In particular, it is considered likely that the mosaic of sand and grass habitats to the south of the site could support notable plant species, in addition to the grass and cliff mosaic habitat within the Site.

4.4.7 Invasive non-native species

Desk study

A total of 48 records of invasive, non-native species (INNS) of fauna and flora listed under Section 9 of the WCA and the Invasive Species (Enforcement and Permitting) Order 2019 were returned from the data search.

Thirteen records of Canada goose (*Branta canadensis*) were found within 2.0km of the Site, the closest record approximately 0.1km south-east of the Site.

A total of six floral INNS were recorded within 2.0km of the Site, they are listed below:

Rhododendron (*Rhododendron ponticum*);

Himalayan balsam (*Impatiens glandulifera*);

Himalayan cotoneaster (*Cotoneaster simonsii*);

Japanese knotweed (*Reynoutria japonica*);

Japanese rose (*Rosa rugosa*); and

Montbretia (*Crocosmia pottsii x aurea = C. x crocosmiiflora*).

The closest records include Japanese rose approximately 0.1km west of the Site, in addition to Japanese knotweed and montbretia approximately 0.1km south-east of the Site.

Field survey

No terrestrial INNS were recorded within 50m of the site during the Extended Phase 1 Habitat survey, although the survey was undertaken outside of the optimal survey period.

One incident of marine INNS, *Austrominius modestus* (Darwin's barnacle) (Grid Ref: 52.719626, -4.0506721), was recorded during the survey.

5. Evaluation of Ecological Features

This section initially evaluates the nature conservation importance of the habitats and species present within the site and surrounding area in terms of their importance in an international, national, regional, county, local and less than local context as per the geographic scale identified in Section 3.3.1. The method used follows the guidance set out in the CIEEM Guidance for Ecological Assessment[1].

Table 6 evaluates all the ecological resources present or potentially present within the site and surrounding area. Those receptors with less than local value or negligible are not further assessed within the context of EcIAs unless there are related legal compliances and/or positive outcomes and enhancements to be assessed.

Table 6 Evaluation of Ecological Features

Ecological Feature	Value	Evaluation
Internationally designated statutory sites		
Lleyn Peninsula and the Sarnau SAC	International	European Sites are designated at an international level and are therefore of international value.
Meirionnydd Oakwoods and Bat Sites SAC		
Northern Cardigan Bay SPA		
Cadair Idris SAC		
Nationally designated statutory sites		
Mawddach Estuary SSSI	National	SSSIs are designated at a national level and are therefore of national value
Barmouth Hillside SSSI		
Non-statutory designated sites		
11 SINCs (see Table 4 for details)	County	SINCs are designated for their presence of habitats of species of local or regional importance by local authorities and are therefore of county value
Two Ancient Woodland Inventory sites	National	Ancient woodland is defined as an irreplaceable habitat and is of national importance
Habitats		
Scattered scrub	Less than local	Provides habitat for protected species; however, connectivity to the wider landscape is low and is of low diversity, limiting its importance to site level.
Broadleaved parkland/scattered trees	Less than local	Semi-mature scattered cherry trees across site. These habitats are common and not considered to have significant value for nature conservation in terms of their diversity; however, they could provide habitat for some protected species. Importance is limited to site level.
Coniferous parkland/scattered trees	Less than local	These non-native habitats are typical and not considered to have significant value for nature conservation in terms of their diversity, although could provide habitat for some protected species.
Intertidal mud/sand and intertidal mud/sand with brown algal beds	International	Habitat included within the 1160 Large shallow inlets and bays citation for Lleyn Peninsula and the Sarnau SAC. This is an Annex I habitat qualifying feature of the SAC.

Ecological Feature	Value	Evaluation
		The intertidal mudflat is also a Section 7[38] habitat. Intertidal biotope on site included in this habitat: Barren Littoral Coarse Sand.
Intertidal shingles/cobbles and intertidal shingles/cobbles with green algal beds	International	Included within the habitat mosaic of 1160 Large shallow inlets and bays, a primary citation for Lleyn Peninsula and the Sarnau SAC. This habitat may represent areas of cobbles and pebbles in shallow water supporting algal species that can tolerate sand-scour. Intertidal biotopes on site included in this habitat: shingle (pebble) and gravel shores; barren littoral shingle.
Intertidal boulders/rocks and intertidal boulders/rocks with brown algal beds	National	May be included within the habitat mosaic of 1160 Large shallow inlets and bays, a primary citation for Lleyn Peninsula and the Sarnau SAC. This intertidal habitat is only included within the Annex I 1170 Reef habitat where they are connected to subtidal reefs. Intertidal biotopes on site included in this habitat: Yellow and grey lichens on supralittoral rock; *Pelvetia canaliculata* and barnacles on moderately exposed littoral fringe rock; *Fucus spiralis* on moderately exposed to very sheltered upper eulittoral rock; and *Semibalanus balanoides*, *Fucus vesiculosus* and red seaweeds on exposed to moderately exposed eulittoral rock.
Other intertidal habitat	Local	Other intertidal habitats *Fucus vesiculosus* on mid-eulittoral mixed substrata; *Ascophyllum nodosum* on full salinity mid eulittoral mixed substrata; barren littoral coarse sand.
Other exposure	Less than local	Rock exposure that has become colonised by vegetation; habitats are considered to have some limited nature conservation value in enhancing the site's overall diversity.
Amenity grassland	Less than local	These habitats are considered to have a low nature conservation value.
Introduced shrub	Less than local	These ornamental habitats are fairly typical and not considered to have significant value for nature conservation in terms of their diversity, although could provide habitat for some protected species.
Fence	Negligible	This habitat is considered to have negligible nature conservation value.
Wall	Negligible	This habitat is considered to have negligible nature conservation value with few commonly occurring plant species;
Artificial sea wall	Local	The habitat is not considered to have significant value for nature conservation in terms of diversity, although may provide habitat for some protected intertidal species.
Buildings	Negligible	At least three buildings were noted with limited potential to support roosting bats, including St David's Church, a public toilet block and residential housing. Barmouth bridge adjacent to the site may also have limited potential to support roosting bats.

[38] Section 7 Priority habitats and Section 7 Priority species Environment (Wales) Act 2016 lists found at https://www.biodiversitywales.org.uk/environment-wales-act (Accessed 25/06/23).

Ecological Feature	Value	Evaluation
		It is considered unlikely that bats associated with the Meirionnydd Oakwoods and Bat Sites SAC (lesser horseshoe) would be present within buildings at the site, this is due to the existing high level of disturbance at the site from road traffic, the railway, and existing artificial street lighting acting as a deterrent. Also, there are no continuous vegetated corridors connecting the buildings on site to the adjacent SAC. Considered to be of low ecological value, although there may be limited potential for roosting bats.
Species		
Bats	International and Local	Limited potential bat roosting habitats were identified within the site, with no roost records returned on the site. Lesser horseshoe bat records have been returned in the search area. It is considered unlikely that bats associated with the Meirionnydd Oakwoods and Bat Sites SAC (lesser horseshoe) would be present within the site itself; this is due to the existing high level of disturbance at the site from road traffic, the railway, and existing artificial street lighting acting as a deterrent. Also, there are no continuous vegetated corridors connecting the buildings on site to the adjacent SAC. Nevertheless, the site would be considered as being within the foraging range of the Meirionnydd Oakwoods and Bat Sites SAC (50m) designated for Annex II lesser horseshoe bats and therefore the fringes of the site are precautionarily considered to be of International importance. Within the site, buildings and the general site area may support common and widespread species that are tolerant of urban conditions and are therefore considered to be of local importance.
Otter	International	No signs of otter were recorded on site; however, the rock armour on site may hold low potential for otter resting sites/holts. 1355 Otter is an Annex II species present as a qualifying feature for the Lleyn Peninsula and the Sarnau SAC (on site). Otters are precautionarily considered of international importance.
Water vole	Negligible	No suitable habitat for water vole was recorded within 50m of the site and no records were identified of this species during the desk study. Water vole are therefore likely absent from the Site.
Badger	Negligible	No evidence of badger was found and habitats on site are unsuitable for sett building, although suitable foraging habitat is present in surrounding habitats.
Hazel dormouse	Negligible	No records of dormice were returned in the desk study, they are considered rare within the region[33] and there is insufficient suitable habitat for dormouse to be present. Dormouse are therefore likely absent from the site.
Marine Mammals	International	No evidence of bottlenose dolphin or grey seal has been recorded within 2.0km of the Site, however both species are qualifying features of the Lleyn Peninsula and the Sarnau SAC.

Ecological Feature	Value	Evaluation
Other notable mammals - terrestrial	Less than local	No signs found within the site, but suitable habitat for mammals including hedgehog, a Section 7 species, and polecat were identified on or adjacent to the site.
Breeding birds	Less than local	The species on site are locally common, and widespread in the local area. Northern Cardigan Bay SPA (3.5km W), hydrologically connected to the site, this SPA is designated for supporting overwintering red-throated diver. However, the site itself is unlikely to support this species. Areas on the seafront are likely to be too regularly disturbed (due to lighting, noise and human presence) to be used by estuarine species.
Reptiles	Less than local	Records have been returned nearby and habitats within 50m of the site including cliff, exposed rock, gardens, sand, walls and scrub provide suitable foraging and basking habitat for reptiles including common lizard and adder. However, there is limited suitable habitat due to high disturbance levels on site.
Amphibians	Negligible	No suitable amphibian habitat was recorded during the Extended Phase 1 Habitat survey and no records were returned during the desk study. Amphibians are therefore likely absent from the Site.
Invertebrates (terrestrial)	Less than local	Terrestrial invertebrates on site are relatively widespread and considered to be of less than local value.
White-clawed crayfish	Negligible	White-clawed crayfish are not likely to be present within the estuarine habitats on Site, due to suspected unfavourable brackish and saltwater environment and habitat substrate (bare mud/sand) and are rarely found in North West Wales.
Invertebrates (marine)	Local	Intertidal/marine invertebrates identified in the intertidal survey are relatively widespread and common, and considered to be of local value.
Fish	Local	No records have been returned nearby, however, the mosaic of habitat within the estuary provides opportunity for many species that thrive in intertidal habitat.
INNS	N/A	Darwin's barnacle (*Austrominius modestus*) has been recorded on site. INNS do not have an ecological value; however, an awareness of INNS locations is required to ensure legal compliance of works with regards to not causing INNS to spread.

6. Description of the Proposed Development

6.1 Scope of Works

Detail design has focused only on frontage 1 (Figure 1b).

Works include:

- Existing seawall to be rebuilt with precast concrete units, faced with stone masonry cut from stones in existing seawall.
- New raised section of seawall immediately behind rebuilt seawall, with stone block masonry finish.
- Existing 'temporary' rock armour to be redistributed across front of seawall with additional smaller stones incorporated as required.
- New surface water outfall on beach further out than existing viaduct.
- Existing outfall and pipe onto beach to be removed.
- Single and double leaf flood gates.
- Control box for new underground pumping station and new chambers (arrangement tbc).
- New setback wall at rear of garden with stone block masonry finish.
- New gulleys and chambers to increase highway drainage capacity at low point (arrangement tbc).
- Existing paviors replaced with raised pedestrian crossing (blending).
- Existing stub wall and railings removed.
- Paved area incorporated into Viaduct Gardens
- New railings creating new perimeter to viaduct gardens.
- New raised section of seawall tapers down from 5.60 in corner to ground under viaduct.

Refer to the following drawings for more information in Appendix B:

- 285699-ARP-XX-DR-GEN-150- proposed site layout.
- 285699-ARP-XX-DR-STR-360- proposed seawall details- typical section
- 285699-ARP-XX-DR-STR-290- proposed drainage sections- new outfall

6.2 Construction methodology

Construction methodology is detailed in within the HRA SIAA (refer to Appendix F). A summary of the construction methodology particularly relevant to the sensitive habitats on site is provided below:

Works to the wall

- Access – access to seaward side via ramp 50m away. Plant (tracked excavator and tracked dumpster) will return to top of the ramp storage area at end of each shift. The majority of the works will be carried out from the viaduct gardens site to avoid marine working.

- Temporary works- sheet piling or king post walls will be used to support the embankment, mainly installed from the viaduct gardens side. Current wall and beach rock armour will remain in place during installation of temporary works. Existing surface water drainage outfalls will be maintained as active throughout the works until it is swapped over to the permanent works.

- Existing wall demolition/removal- Existing wall will be demolished in sections with exposed wall dependant of extent of temporary works protection to the embankment. Existing rock armour at the toe of the wall will be moved back form the wall to expose the face.

- Wall foundations- Concrete (poured by skip or pump from viaduct gardens side) pour will be done early in shift to allow curing before next tide, with time times and heights monitored for the activity.

- Precast wall- PCC units will be laid directly on the base in situ slab once cured. With the PCC unit anchored into the base slab using grouted in dowels. PCC unit will be craned in by an excavator, either form the top of the embankment or from the bottom, dependant on working space around existing structures. Backfill for middle wall will be done form the gardens side of the wall with

placement and compaction carried out in thin layers. Upper part of wall and where new and existing outfalls will be cast in situ.

- Cast in situ sections- Concrete pours for the will be done using pump or skip for the top of the wall.
- Insitu parapet wall- Access to the parapet will be mainly form the garden, with scaffold used on the seaward side.
- Rock armour- Previously removed armour stored at beach level will be placed by excavator on the geotextile laid against the new wall. Additional armour will be delivered to the harbour side by road wagon and transferred to temporary stockpile.

Works to the outfall

- Temporary works- Existing piped outfall will remain operational until new system is complete, and rock armour excavated from the wall works may be used to protect the new piped outfall area.
- Pipe work installation- Timing of the works will be to coincide with good weather and low tides (excavation work may go as low as approximately -0.5 AOD). Material will be brought in by a dumper across the beach. Placement of the concrete mattress will be done when tides and weather conditions are favourable, with accelerators considered to be used to ensure the concrete cures before next tide.
- Concrete surround- Shutters will be placed either side of the pipe and anchored to the concrete mattress. Concrete will either be pumped to works area or brough in with dumper and place with excavator. Shutters will be removed once concrete is cured and take off site.
- Outfall detail- Rock armour will be paced in the end by excavator with material brought in by dumper along the beach. Once complete any rock armour used as temporary protection will be removed and taken back to the wall as permanent works. Beach levels will be restored round the new pipe and debris from the works cleared away.

6.3 Assumed Construction Practices and Licence Requirements

This section describes some established and uncontroversial standard best practice construction techniques and methods which will be employed to avoid or reduce the risk of potential impacts, in particular habitat damage, disturbance and species mortality. The following paragraphs describe some of the measures which will be adopted to avoid or reduce potential impacts. These will be described in detail in the Construction Environmental Management Plan (CEMP), which will be provided at a later date under an anticipated planning condition, and the adoption and implementation of these measures and best practice construction techniques will be secured through the submission of schemes to discharge appropriate planning conditions.

This section also describes protected species licences which may be required to be obtained in advance of construction taking place. The licences are likely to include those necessary to mitigate impacts on European Protected Species (EPS). Licences will be issued by NRW and will include details of the measures, techniques and strategies to be adopted. This section is based on a series of assumptions for the measures, techniques and strategies which will conditioned as part of the licences, and these will be integrated into the working practices and methods for the construction.

In addition to that which is described below, the CEMP will also provide more detail on the requirement and timing required for pre-construction surveys for protected species, a Suitably Experienced Ecologist (SEE) acting as an Ecological Clerk of Works (ECoW) to, for example, oversee management of ecological issues as they arise, and to educate site personnel in ecological issues where needed. This will include Toolbox Talks provided by the ECoW to all site personnel to inform them of ecological resources at the site including INNS, protected and notable species prior to the commencement of construction works. An associated registry of attendance will be signed and kept as a record and a copy of the toolbox talk left at the site office.

If any protected species or signs of protected species, or other ecological resources including INNS are encountered during the works, all work in the vicinity is to stop immediately and a ECoW contacted as soon as possible for advice.

6.3.1 Embedded Avoidance Measures

Construction activities have the potential to result in adverse effects of varying magnitude and duration through, for example, killing, injury or disturbance of protected species, loss of habitat, pollution effects and sediment ingress to watercourses.

Therefore, the following general avoidance measures to avoid or minimise negative impacts upon ecological resources will be implemented during the construction phase to comply with existing legislation and good practice as detailed below:

6.3.1.1 Designated sites, habitats, plants and INNS

Avoidance

Measures may be required to avoid access to sections of the mid to lower shore where trafficking of vehicles may directly impact sensitive marine habitats; tracking of vehicles over the intertidal area, in particular the areas of rock and boulders lower down on the shore, should be avoided wherever practicable.

Access to the working areas will be via designated tracks only, and storage of materials will be at pre-agreed locations, on existing hardstanding and/or low value 'amenity' grassland areas within the site rather than on higher value intertidal habitats. The majority of the works will be carried out from the viaduct garden side of the wall to avoid marine working.

Standard pollution prevention and control measures

There is a risk that construction activities may inadvertently lead to dust, pollution events, or sediment run-off resulting in damage to those habitats (including designated sites and watercourses) that are within relative close proximity and / or are hydrologically connected to the construction footprint. These risks will be avoided or reduced through following standard best-practice techniques and methods which will be detailed within the CEMP and are summarised below.

Works in the vicinity of the estuary and intertidal zone shall adopt pollution prevention measures to avoid pollution incidents and minimise silt dispersed downstream. Integration of Guidance for Pollution Prevention (GPP[1]) into the contractors CEMP will be essential to avoid impacts on sensitive marine habitats.

Additional measures are proposed in the HRA for the Lleyn Peninsula and Sarnau SAC as below:

- Contractor to prepare and adhere to a CEMP which will detail what measures will be in place to protect the surrounding environment. Location of adjacent protected sites shall be clearly highlighted.
- Materials stored on site shall be located more than 10m away from watercourses or estuary habitat at all times.
- Pollution spill kits to be readily available on site and in plant/machinery at all times, with staff suitably trained in how to deploy.
- Contractor to have emergency incident response procedure in place in the case of a spillage.
- Contractor to adhere to pollution prevention best practice guidelines, including;
    - PPG1: Understanding your environmental responsibilities.
    - GGP5: Works and maintenance in or near water.
    - PPG6: Working at construction and demolition sites.
    - GPP21: Pollution response planning.
    - GPP22: Dealing with spills.
- Biodegradable lubricant and hydraulic oil to be used in plant machinery where possible. Biodegradable oils are less toxic than most synthetic oil but should still be stored to the same standards as other oils and prevented from entering the water environment.

- Works to take place at low tide conditions only. No works to be completed within the intertidal area when the adjacent mudflat and sandflats are inundated with seawater.
- Any excess concrete material or wash-water shall be fully and securely contained and disposed of appropriately off site
- All concreting works to take place at low tide conditions, allowing sufficient time for concrete to set prior to any potential tidal inundation. Curing accelerators to be used where necessary.
- Contractor to monitor tidal and weather conditions / forecasts and plan work accordingly.
- Materials stored on site shall be located more than 10m away from watercourses or estuary habitat at all times.
- Works to take place at low tide conditions only. No works to be completed within the intertidal area when the adjacent mudflat and sandflats are inundated with seawater.
- Access to and along the intertidal area to be via the main harbour slipway and along a designated pathway to keep potential habitat disturbance to a minimum.
- Bog mats to be used under plant/machinery in any soft parts of the intertidal areas to reduce potential compaction impacts.
- There shall be no access to mid – to lower shore where trafficking of vehicles may directly impact sensitive marine habitats.
- Excavations to be backfilled in same layers as they were removed, so that the top 1m layer of sediment removed goes back in at this level, and anoxic materials lower down is returned to the bottom of the excavations. This will aid recovery of the habitat following excavation works.
- Beach material excavated for the pipe is to be placed within the surrounding intertidal area and not taken from site.
- Beach levels to be restored around the new pipe once construction work is complete, using existing excavated beach material.
- Pilling and other related construction works shall occur in dry conditions only. Pilling will cease and standing time will be implemented during high tide.
- All relevant persons on site to be made aware of the mitigation and obligations in place, and to be briefed with a toolbox talk on the relevant ecological issues prior to commencement of the work.
- Works shall be confined to daylight hours and no additional artificial lighting shall be used.

WFD higher sensitivity habitats were identified in proximity to the works. Any water quality impacts on marine resources will be managed via WFD requirements, and the mitigation proposed above; principally GPP compliance. A Coastal Water Framework Directive (WFD) Compliance Assessment must be undertaken, and mitigation measures outlined to ensure the project does not lead to a deterioration in WFD status or prolong the attainment of targeted objectives. Further, this assessment is a requirement for a marine licence.

Biosecurity

Best practice will be followed in relation to biosecurity with machinery/vehicles and footwear being washed upon entering site and leaving Site.

Due to the presence of a marine INNS at the site (Darwin's barnacle), there is a need to comply with biosecurity measures to avoid the transfer of INNS. Since works are proposed within the marine environment with known INNS, it is recommended that a Biosecurity Risk Assessment is prepared by a suitable contractor in advance to avoid the risk of introduction of marine INNS or transfer of known INNS to other sites.

6.3.1.2 Protected and notable species

General measures

Lighting: If any task lighting is required outside daylight hours (typically 30 minutes after sunrise and up to 30 minutes before sunset), directional lighting (towards the ground) with minimal upward spill will be implemented to ensure no light spill over 0.5 Lux on to any vegetation, trees or watercourses which may disturb nocturnal species. This will be secured through the planning application.

Excavations: Any open excavations during construction should be covered at night or a means for escape such as ramps provided to reduce the risk of trapping or injuring otter or badger (as well as any other animals that may enter the Site).

Vegetation clearance: vegetation clearance is currently undetermined to facilitate the works, habitat losses are to be confined to amenity grassland, the trees, the planters and intertidal habitats (0.0084ha permanent loss for the outfall). Should small-scale temporary clearance be required, this should be conducted under a Precautionary Method of Working (PMW), such as a phased and directional approach overseen by a ECoW, to be detailed within the CEMP. Any permanent loss of habitats, including trees, will be enhanced and replaced on a 2:1 basis.

Access: Access to the working areas will be via designated tracks only, and storage of materials will be at pre-agreed locations. Materials or plant will not be left overnight in an area that may prohibit access to commuting mammals (such as otter or badger).

Bats

No trees on site were identified as suitable for roosting bats; however, at least three buildings within 50m of the site (St David's Church and residential housing) were noted to have some features that could support roosting bats. Further detailed inspections of these potential features were not undertaken, however the suitability of features present are reduced due to lack of connective flightlines and high levels of street lighting present, likely limiting bat presence to common and widespread species that are well adapted to urban conditions. Exposed rock and cliff face habitat situated within 50m to the north of the site also has potential to support roosting bats in voids or crevices such as cracks, breaks and flakes. The sea wall on site and Barmouth bridge adjacent to the site were considered to be of negligible suitability for roosting bats

No removal or significant disturbance of potential roosting habitats (buildings or rock/cliff-face) are proposed. Methodologies to avoid or minimise disturbance will be fully detailed within the CEMP. No key commuting and/or foraging routes will be significantly impacted.

Further measures outlined in the HRA[10] regarding bats associated with the nearby Meirionnydd Oakwoods and Bat Sites SAC will be adhered to.

Otter and badger

No otter resting places or badger setts have been recorded within or adjacent to the site. Otter surveys have been completed by Ymgynghoriaeth Gwynedd Consultancy (YCG) and no resting places, holts or otter signs were reported (YCG, pers. comm). Pre-construction surveys will be conducted for otter to establish whether there are any changes to this current baseline which may result in the need for an EPS development licence for otter. It is unlikely that badger setts will be present within the site due to the absence of suitable sett-building habitat. However, due to the presence of suitable foraging habitat, the survey for otter will also include a search for evidence of badger, and the measures described below are also suitable for avoiding or minimising potential impacts to badger.

Night-time works could disturb resting, foraging or commuting otters or badgers within approximately 100m of the proposed development, and all day and night works could disturb resting and breeding otter up to 200m[39]. Details on work timings to reduce disturbance to otter and badger will depend on the pre-construction results and any associated development licence requirements; any restrictions will be within the

[39] Forest Research, Forestry Commission (England, and Corporate and Forestry Support Division) and Natural England (2013) Guidance on managing woodlands with otter in England. Version 2.

final detailed CEMP. A buffer zone should be maintained around waterbodies at night to avoid unnecessary adverse impacts to otter, details of which would be incorporated into the CEMP.

Other terrestrial mammals and invertebrates

No additional specific measures would be required for other notable mammals (such as hedgehog and polecat) and invertebrates.

Breeding birds

The detailed design of vegetation clearance to facilitate the works has not been determined. However, if any small-scale, temporary clearance is required, this should be conducted under a PMW and avoid the breeding bird season (March-August inclusive) to prevent damage or destruction of occupied nests or harm to breeding birds. If this cannot be achieved, works within the core bird nesting season will require an inspection for breeding birds and their occupied nests by a ECoW no more than 24 hours prior to any works commencing. If nesting birds are found during the pre-construction checks, a buffer around the nest will be implemented of at least 5 metres (species conservation status dependent) as agreed with the ecologist and further work within the immediate and surrounding area will be delayed until young have fledged and left the nest, and the nest is no longer in use. Netting of any buildings, vegetation or trees to prevent nesting will not be employed.

Reptiles

No clearance of vegetation is expected for the works to take place; however, the wall may provide suitable hibernation and refuge habitat for reptiles. As such, the demolition of the wall which will be undertaken under methodologies outlined in the CEMP and overseen by a ECoW. Where possible, demolition works of the wall will be avoided or be kept to a minimum during the reptile hibernation period (November to February).

Marine species, including invertebrates and fish

Indirect effects on marine species resulting from water pollution within intertidal habitats will be managed via the measures outlined in Section 6.3.1 and to be described within the CEMP.

Marine mammals

Indirect effects on bottlenose dolphin and grey seal resulting from water pollution and noise pollution within intertidal habitats will be managed via the measures outlined in Section 6.3.1, including only working at low tide so that noise from piling is not transmitted through the water column, and to be described within the CEMP.

6.4 Operation

Where possible, the proposed development has been designed to avoid or reduce the magnitude of the potential impacts and risks. Terrestrial vegetation clearance is currently undetermined to enable the works, however, permanent habitat losses will be limited in extent. For the intertidal habitats, confirmed habitat losses comprise permanent habitat loss of 0.0084ha of intertidal habitat (sand, shingle and cobbles), replaced with the hard substrate of the outfall casing and scour protection. Operation of the site includes surface water being discharged into the intertidal area via the new outfall.

7. Assessment of Effects

The assessment of impacts of the proposed development upon ecological resources is undertaken with consideration of both construction activities and the operational use of the Site. Mitigation measures are proposed in response to the impacts identified to avoid or reduce the ecological effects, in line with the mitigation hierarchy[1]. The effects from both the construction and operation of the scheme taking into account the mitigation measures are then assessed for all the ecological resources present, or potentially present, within the study area that are valued as local and above, or if they require legal compliance in relation to international and national legislation, or compliance with local policy.

7.1 Potential Effects

7.1.1 Construction

The potential negative impacts on ecological resources likely to arise during construction are:

- Temporary loss or degradation of a discrete area amenity grassland habitat for access/storage, lasting for the length of the construction period;
- Permanent habitat loss of 0.0084ha of intertidal habitat (sand, shingle and cobbles), replaced with the hard substrate of the outfall casing and scour protection;
- Permanent habitat degradation due to spread of intertidal INNS (Darwin's barnacle) via construction activities;
- Temporary habitat degradation from potential pollution and sedimentation events, including dust;
- Temporary habitat degradation to lichen and green algae during relocation of the rock armour;
- Permanent habitat damage to roots of retained vegetation adjacent to works areas;
- Species mortality/injury, for example collisions with construction vehicles or during demolition of the wall; and
- Species disturbance from construction noise, vibration and lighting.

Scoped out construction impacts:

- Temporary habitat degradation on intertidal mudflat/sandflats during tracking of plant over the beach from the ramp (slipway) access. Disturbance to sandflats and mudflats from construction traffic will be temporary and negligible, due to the sediment protecting the mobile infauna within. Temporary habitat degradation impacts due to tracking of plant during construction have therefore been scoped out of further assessment.
- Any temporary nitrogen deposition on sensitive habitats within 200m from construction vehicles is expected to be imperceptible. Furthermore, the topography of the area means that several potentially sensitive habitats (e.g. heathland within Dinas Oleu SINC) are situated at higher altitudes and any localised air quality changes would not impact wider habitats. Air quality effects during construction have therefore been scoped out of further assessment.
- No pathways for effect have been identified between the works area and any non-statutory designated sites (the SINCS and AWI sites are terrestrial with no connection to the site). Impacts to non-statutory designated sites during construction have therefore been scoped out of further assessment.

7.1.2 Operation

The following potential operational effects have been scoped out:

- Changes in coastal processes following works to the wall and construction of the new outfall are considered minimal due to the scale of the scheme and similarity with the existing situation.
- Any nitrogen deposition on sensitive habitats within 200m from vehicles during operation is expected to be imperceptible. Furthermore, the topography of the area means that several potentially sensitive habitats (e.g. heathland within Dinas Oleu SINC) are situated at higher altitudes and any localised air quality changes would not impact wider habitats. Air quality effects during construction have therefore been scoped out of further assessment.
- Habitat degradation through increase in freshwater to the intertidal area during rainfall events from the outfall, potentially resulting in changed species distribution around the mouth of the outfall to more brackish tolerant species. The new surface water outfall will also remove some flow from an existing functioning CSO located 15 m to the west which discharges in the same intertidal area. The effect of freshwater influx is considered to be both minimal and restricted to the immediate area around the outfall; additionally, the outfall will not discharge directly onto any priority habitats and therefore this effect has been scoped out of further assessment.
- No pathways for effect have therefore been identified between the site and any non-statutory designated sites (the SINCS and AWI sites are terrestrial with no connection to the site). Impacts to non-statutory designated sites during operation have therefore been scoped out of further assessment.

No other potential negative impacts on ecological resources were determined to be likely during operation.

7.2 Assessment of Effects

The assessment presented in this section takes into account the potential impacts (Section 7.1) to each valued ecological resource (Section 5) and the anticipated construction practices (Section 6.3) and embedded avoidance measures (Section 6.3.1), to determine the significance of the effects.

Measures to further mitigate for these impacts, and enhancements that go beyond mitigating in order to attain biodiversity net benefits, are described in Section 8 below, with the significance of any residual effects then assessed (Table 7).

7.2.1 International Designated Statutory Sites

Following a screening assessment, the first stage of the HRA[8] identified that there would be 'Likely Significant Effects' for Lleyn Peninsula and the Sarnau SAC in the absence of mitigation. Therefore, the assessment progressed to Stage 2 'Appropriate Assessment' stage, which considered the potential for the works to have an adverse effect on the integrity of the sites, taking proposed mitigation measures into account. The Meirionnydd Oakwoods and Bat Sites SAC, Northern Cardigan Bay SPA and Cadair Idris SAC were scoped out due to no likely significant effects and therefore are not considered further.

A HRA SIAA[10] was produced that identified likely significant effects relating to the Lleyn Peninsula and the Sarnau SAC, in the absence of mitigation. These comprised pollution, habitat degradation and disturbance of mobile species.

Detailed mitigation measures were then proposed within the SIAA (listed in Section 6.3.1) that would eliminate the chance of any residual effects on the integrity of the sites. Therefore, construction and operational effects are considered to be of **insignificance at an international level.**

Note that whilst the HRA[10] assessment assessed impacts of the works on International Sites and their qualifying features, the sections below sometimes assess impacts on the same species (such as otters or bats) but in EcIA terms.

Significance of Residual Effects

Following implementation of the mitigation mentioned above, no significant negative residual effects are anticipated.

7.2.2 Nationally Designated Statutory Sites

Habitats described within the citations for both SSSIs (Mawddach Estuary SSSI and Barmouth Hillside SSSI) could be subject to temporary and permanent habitat degradation from INNS spread, pollution and sedimentation, including dust, as well as permanent loss of 0.0084ha of intertidal habitat within the Mawddach Estuary SSSI, during construction.

The CEMP will detail standard best practice pollution and sedimentation prevention measures and dust control measures which will be put in place during the works. This will ensure no negative effects from pollution on the Barmouth Hillside SSSI which is a terrestrial site located approximately 20m away. In addition, a Biosecurity Risk Assessment should also be prepared to avoid the risk marine INNS spread within the Mawddach Estuary SSSI (located within the site area).

The permanent loss of intertidal habitat (0.0084ha) located within the Mawddach Estuary SSSI is considered to be minimal compared to its total size (1,350ha), though any loss of valuable habitat should be adequately mitigated through offsetting in order to comply with national and local planning policy, preferably reinstated on a like-for-like basis.

As above, the size of the site and areas impacted are considered to be negligible in relation to the overall size of the SSSI, and potential impacts from pollution or invasive species spread are mitigated though the CEMP. Therefore, construction and operational effects are considered to be of **insignificance at a national level.**

Significance of Residual Effects

Following implementation of the pollution and sedimentation prevention measures outlined in the CEMP, preparation and adherence to a Biosecurity Risk Assessment, and reinstatement of lost habitat, no significant negative residual effects are anticipated on either the Mawddach Estuary SSSI or Barmouth Hillside SSSI.

7.2.3 Habitats

Habitats on site could be subject to the following potential impacts during construction in the absence of mitigation:

- Root damage to retained trees and introduced shrub;
- Temporary loss or degradation of amenity grassland habitat during access/storage;
- Permanent habitat loss of 0.0084ha of intertidal habitat (sand, shingle and cobbles);
- Temporary habitat degradation from potential pollution and sedimentation, including dust;
- Permanent degradation of intertidal habitats due to spread of marine INNS; and
- Temporary habitat degradation to lichen and green algae during relocation of the rock armour.

Habitats within and adjacent to the site may be subject to temporary disturbance through use of machinery on site or access required during operation.

Mitigation Measures

The CEMP will detail standard best practice pollution and sedimentation prevention measures and dust control measures which will be put in place during the works. A Biosecurity Risk Assessment should also be prepared to avoid the risk marine INNS spread. Retained trees on site should be protected in line with BS 5837:2012[40] (these measures will also be included in the CEMP).

The permanent loss of intertidal habitat is considered to be minimal compared to the availability of similar habitat in the wider area, though any loss of valuable habitat should be adequately mitigated through offsetting in order to comply with national and local planning policy, preferably reinstated on a like-for-like basis. Any terrestrial habitat disturbance will be temporary and reinstated on a like-for-like basis.

[40] British Standards Institute BS 5837:2012. Trees in relation to design, demolition and construction.

Relocation of the rock armour may cause temporary disturbance to the lichen and green algae, including potential smothering should colonised rock armour be placed at a different orientation on the sediment. However, due to the nature of the habitat and species, quick recovery is anticipated. The areas of rocks and boulders lower down on the shore provide additional suitable attachment for brown and green algae, which may provide habitat for a variety of intertidal species such as crustaceans, fish and molluscs and this habitat will remain post-construction.

Access to the working areas will be via designated tracks only, and storage of materials will be at pre-agreed locations. Materials or plant will not be left overnight in an area that may prohibit access to commuting mammals (such as otter).

Therefore, taking into account the above measures, construction and operational effects per habitat are considered to be as follows:

- Scattered scrub – **of insignificance at a less than local level**
- Broadleaved parkland/scattered trees and coniferous parkland/scattered trees – **of insignificance at a less than local level**
- Intertidal mud/sand and intertidal mud/sand with brown algal beds **– of insignificance at an international level**
- Intertidal shingles/cobbles and intertidal shingles/cobbles with green algal beds **– of insignificance at an international level**
- Intertidal boulders/rocks and intertidal boulders/rocks with brown algal beds **– of insignificance at a national level**
- Other intertidal habitat – **of insignificance at a local level**
- Other exposure, amenity grassland and introduced shrub – **of insignificance at a less than local level**
- Artificial sea wall – **of insignificance at a local level**

Significance of Residual Effects
Following implementation of the pollution and sedimentation prevention measures outlined in the CEMP, preparation and adherence to a Biosecurity Risk Assessment, and reinstatement of lost habitat, no significant negative residual effects are anticipated on any habitats on site.

7.2.4 Bats

Foraging and commuting bat species may be subject to increased levels of disturbance by noise, vibration and lighting during construction.

As no trees on site were identified as suitable for roosting bats, no impacts are predicated to bats roosting within trees. Similarly, the sea wall on site and Barmouth bridge adjacent to the site were inspected for potential roost features; however, they were considered to be of negligible suitability for roosting bats and therefore no impact in terms of bats is anticipated in relation to these structures.

Bat species may be present within buildings noted within 50m of the site, though the suitability of features present are reduced due to lack of connective flightlines and high levels of street lighting present, likely limiting bat presence to common and widespread species that are well adapted to urban conditions. There will be no direct impacts to these buildings with works, with the majority of works located on the opposite side of the A496, and particularly noisy works (e.g. pile driving) located at least 20m from these buildings. Works are likely to be of short duration, undertaken over a period of one month, and any bats present within these buildings are likely to be acclimatised to a high level of background disturbance given the urban location, adjacent to the main road running through Barmouth, and close proximity of the railway line. As such, it is considered unlikely that there would be significant disturbance of bats within any roosts (as defined within the Wildlife and Countryside Act) compared to the existing baseline and no effects on these features are anticipated.

Exposed rock and cliff face habitat situated approximately 50m to the north of the site may have potential to support roosting bats. Any voids present, along with cracks, breaks and flakes noted during the survey, could support a range of bat species; however, there will be no direct impact on this feature and, given the distance from the works (which are separated from the site by a row of residential and commercial properties, which will assist in dampening any noise from works), no significant disturbance of these potential roosting habitats is currently anticipated.

Taking into account the above measures, construction and operational effects are considered to be of **insignificance at an International level** (for lesser horseshoe**)** and **of insignificance at a Local level** (other bat species).

Mitigation Measures

No works are to be undertaken at night. If any task lighting is required outside daylight hours (typically 30 minutes after sunrise and up to 30 minutes before sunset), directional lighting (towards the ground) with minimal upward spill will be implemented to ensure no light spill over 0.5 Lux on to any vegetation, trees or watercourses which may disturb nocturnal species. This will be secured through the planning application.

Methodologies to avoid or minimise disturbance will be fully detailed within the CEMP. Further, any measures outlined in the HRA[3] regarding bats associated with the nearby Meirionnydd Oakwoods and Bat Sites SAC will be adhered to.

Significance of Residual Effects

The vegetation clearance required will be updated once the detailed design has been determined; however, it is anticipated that there will be a relatively low-level of disturbance required during construction to accommodate the works and, following implementation of the CEMP and other measures described above, no significant negative residual effects are anticipated for bats.

7.2.5 Otter

Resting/breeding, foraging and commuting otter may be subject to increased levels of disturbance by noise, vibration and lighting during construction. Foraging and commuting otter may also be subject to increased risk of mortality/injury due to collisions with construction vehicles or entrapment within excavations.

Otter surveys have been recommended in the PEA (Appendix C). Surveys have been previously undertaken by YGC.

Mitigation Measures

Pre-construction surveys will be conducted for otter to establish whether there are any new resting/breeding sites, which may result in the need for an EPS development licence for otter.

Night-time works could disturb resting, foraging or commuting otters within approximately 100m of the proposed development, and all day and night works could disturb resting and breeding otter up to 200m[39]. Details on work timings to reduce disturbance to otter will depend on the pre-construction results and any associated development licence requirements; any restrictions will be within the final detailed CEMP. A buffer zone should be maintained around waterbodies at night to avoid unnecessary adverse impacts to otter, details of which would be incorporated into the CEMP.

Any open excavations during construction should be covered at night or a means for escape such as ramps provided to reduce the risk of trapping or injuring otter (as well as any other animals that may enter the Site).

If any task lighting is required outside daylight hours (typically 30 minutes after sunrise and up to 30 minutes before sunset), directional lighting (towards the ground) with minimal upward spill will be implemented to ensure no light spill over 0.5 Lux on to any vegetation, trees or watercourses which may disturb nocturnal species. This will be secured through the planning application.

Access to the working areas will be via designated tracks only, and storage of materials will be at pre-agreed locations. Materials or plant will not be left overnight in an area that may prohibit access to commuting mammals such as otter.

Taking into account the above measures, construction and operational effects are considered to be of **insignificance at an international level.**

Significance of Residual Effects

Due to the relatively low-level of disturbance required during construction to accommodate the works and following implementation of the CEMP and other measures described above, no significant negative residual effects are anticipated for otter.

7.2.6 Marine mammals

Bottlenose dolphin and grey seal may be at risk of injury from potential pollution and sedimentation, as well as disturbance from construction noise, vibration and water pollution during construction.

Mitigation Measures

Pilling and other related construction works shall occur in dry conditions only. Pilling will cease and standing time will be implemented during high tide. This will ensure that neither species would be likely to be close enough to the site to be impacted by noise or vibration effects. Additionally, the CEMP will detail standard best practice pollution and sedimentation prevention measures and dust control measures which will be put in place during the works.

Taking into account the above measures, construction and operational effects are considered to be of **insignificance at an international level.**

Significance of Residual Effects

Following implementation of the pollution and sedimentation prevention measures outlined in the CEMP, no significant negative residual effects are anticipated on any marine mammals.

7.2.7 Other notable mammals – terrestrial

Notable mammals such as hedgehog or polecat could be subject to disturbance from terrestrial works. Foraging animals may be subject to increased levels of disturbance by noise, vibration and lighting during construction and may also be subject to increased risk of mortality/injury due to collisions with construction vehicles or entrapment within excavations.

Mitigation Measures

Any open excavations during construction should be covered at night or a means for escape such as ramps provided to reduce the risk of trapping or injuring mammals.

If any task lighting is required outside daylight hours (typically 30 minutes after sunrise and up to 30 minutes before sunset), directional lighting (towards the ground) with minimal upward spill will be implemented to ensure no light spill over 0.5 Lux on to any vegetation, trees or watercourses which may disturb nocturnal species. This will be secured through the planning application.

Access to the working areas will be via designated tracks only, and storage of materials will be at pre-agreed locations. Materials or plant will not be left overnight in an area that may prohibit access to commuting or foraging mammals such as hedgehog and polecat.

Taking into account the above measures, construction and operational effects are considered to be of **insignificance at a less than local level.**

Significance of Residual Effects

No significant negative residual effects are anticipated for other notable mammals (terrestrial).

7.2.8 Breeding birds

Any vegetation clearance, once determined by detailed design of terrestrial habitats, anticipated to facilitate the works, include young trees that may require translocation. Mitigation measures are described below if

translocation or small-scale clearance is required, however. Mean high water extends up to the seawall, making the intertidal/beach habitat unsuitable for any ground nesting birds.

Mitigation Measures

If any small-scale, temporary clearance or translocation of vegetation is required, this should be conducted under a PMW and avoid the breeding bird season (March-August inclusive) to prevent damage or destruction of occupied nests or harm to breeding birds. If this cannot be achieved, works within the core bird nesting season will require an inspection for breeding birds and their occupied nests by the ECoW no more than 24 hours prior to any works commencing. If nesting birds are found during the pre-construction checks, a buffer around the nest will be implemented of at least 5 metres (species conservation status dependent) as agreed with the ecologist and further work within the immediate and surrounding area will be delayed until young have fledged and left the nest, and the nest is no longer in use. Netting of any buildings, vegetation or trees to prevent nesting is not acceptable and will not be employed.

If any more extensive vegetation clearance is required, this would be subject to a new impact assessment.

Taking into account the above measures, construction and operational effects are considered to be of **insignificance at a less than local level.**

Significance of Residual Effects

Further assessment of vegetation clearance required will be determined upon completion of the detailed design for terrestrial habitats. Following implementation of the CEMP and other measures described above, no significant negative residual effects are anticipated for birds.

7.2.9 Reptiles

The existing wall which is to be demolished may contain features which provide suitable hibernation and refuge habitat for reptiles, and therefore there is a risk that any reptiles present may be subject to injury or mortality.

Mitigation Measures

The demolition of the wall which will be undertaken under methodologies outlined in the CEMP and overseen by the ECoW. This may include careful dismantling of the wall by hand, with periodic fingertip searches by the ECoW. Where possible, demolition works of the wall will be avoided or be kept to a minimum during the reptile hibernation period (November to February) when reptiles are less active and therefore less responsive. Any reptiles found would be moved to a suitable pre-identified refuge outside of the works area.

Taking into account the above measures, construction and operational effects are considered to be of **insignificance at a less than local level.**

Significance of Residual Effects

Following implementation of the CEMP and other measures described above, no significant negative residual effects are anticipated for reptiles.

7.2.10 Terrestrial invertebrates and marine invertebrates

Vegetation clearance has yet to be determined; however, the terrestrial habitats on site to be affected are of relatively low value for invertebrates, and although intertidal sand, shingle and cobbles are of greater value for invertebrates, the loss (permanent loss of 0.0084ha for the outfall) is negligible given the availability of similar habitat in the wider area.

Invertebrates may be at risk of mortality from potential pollution and sedimentation within suitable intertidal habitats.

Mitigation Measures

The permanent loss of intertidal habitat is considered to be minimal compared to the availability of similar habitat in the wider area, though any loss of valuable habitat should be adequately mitigated through

offsetting in order to comply with national and local planning policy, preferably reinstated on a like-for-like basis.

The CEMP will detail standard best practice pollution and sedimentation prevention measures and dust control measures which will be put in place during the works.

Taking into account the above measures, construction and operational effects are considered to be of **insignificance at a less than local level** for terrestrial invertebrates, and of **insignificance at a local level** for marine invertebrates.

Significance of Residual Effects

Following implementation of the pollution and sedimentation prevention measures outlined in the CEMP, and reinstatement of lost habitat, no significant negative residual effects are anticipated on any invertebrate populations on site.

7.2.11 Fish

Fish may be at risk of localised mortality or injury from potential pollution and sedimentation, as well as disturbance form construction lighting.

Mitigation Measures

The CEMP will detail standard best practice pollution and sedimentation prevention measures and dust control measures which will be put in place during the works. If any task lighting is required outside daylight hours (typically 30 minutes after sunrise and up to 30 minutes before sunset), directional lighting (towards the ground) with minimal spill will be implemented to ensure no light spill over 0.5 Lux on to any watercourses. Also, works will only be taken at low tide, so that there is never any working within the water column. This will be detailed within the CEMP and secured through the planning application.

Taking into account the above measures, construction and operational effects are considered to be of **insignificance at a local level.**

Significance of Residual Effects

Following implementation of the pollution and sedimentation prevention measures and lighting specifications outlined in the CEMP, no significant negative residual effects are anticipated on any fish populations on site.

7.3 Summary of Significance of Residual Effects

Table 7 provides a summary of the significance of residual effects for each ecological resource, the mitigation measures required and the means by which mitigation measures can be secured.

Table 7: Summary of significance of residual effects

Ecological Feature (Importance)	**Mitigation Measures Required**	**How Mitigation Measures Secured**	**Significance of Residual Effect**
International Statutory Designated Sites (International)	Pollution, sedimentation and dust control measures, storage and access limits and work timing limits.	CEMP and SIAA	No significant effect.
Nationally Designated Statutory Sites (National)	Pollution, sedimentation and dust control measures, Biosecurity Risk Assessment.	CEMP and planning permission.	No significant effect.
Habitats (International, National, Local and Less than local)	Pollution, sedimentation and dust control measures, Biosecurity Risk Assessment,, root protection measures in line with BS 5837:2012, access and storage limits.	CEMP and this EcIA	No significant effect.
Bats (International and Local)	No night-time working and sensitive lighting strategy to be put in place if task lighting is required during works .	CEMP and this EcIA	No significant effect.

Ecological Feature (Importance)	**Mitigation Measures Required**	**How Mitigation Measures Secured**	**Significance of Residual Effect**
Otter (International)	Pre-construction surveys, night-time working and lighting limits, covering of open excavations overnight (or means of escape provided).	CEMP, this EcIA and an NRW development licence (if required following pre-construction surveys).	No significant effect.
Marine Mammals (International)	Pollution, sedimentation and dust control measures, storage and access limits, work timing limits (no working in water column).	CEMP and this EcIA	No significant effect.
Other notable terrestrial mammals (Less than Local)	Night-time working and lighting limits, covering of open excavations overnight (or means of escape provided). access and storage limits.	CEMP and this EcIA	No significant effect.
Breeding birds (Less than local)	Sensitively timed vegetation clearance overseen by ECoW.	CEMP and this EcIA	No significant effect.
Reptiles (Less than local)	Careful hand-dismantling of the wall to be overseen by ECoW.	CEMP and this EcIA	No significant effect.
Terrestrial invertebrates (Less than local)	Pollution, sedimentation and dust control measures.	CEMP and this EcIA	No significant effect.
Marine invertebrates (Local)	Pollution, sedimentation and dust control measures..	CEMP and this EcIA	No significant effect.
Fish (Local)	Pollution, sedimentation and dust control measures, and lighting limits.	CEMP and this EcIA	No significant effect.

7.4 Cumulative Effects

A cumulative effects assessment is required where the project may have an effect on ecological resources within the zone of influence, but on its own the effects would not be significant. The potential effects of the project should be considered cumulatively with other plans or projects that similarly may have an effect, but where on their own, those effects would not be significant. The combined effects may therefore become significant.

Details of other plans and projects which are currently proposed or consented within the vicinity of the proposed works identified were searched for using the local planning authority website[41] to inform the cumulative effects assessment.

An in-combination assessment has been conducted for European Sites within the SIAA[10] for the project. A search for other plans or projects that may lead to in-combination effects on European sites was conducted and no information was obtained that was able to suggest that there could be other plans or projects acting in-combination with the residual effects of the proposed works to create an adverse impact on the integrity of any European sites (see the SIAA for further details).

For the remaining ecological resources, the search was curtailed to within a 2km radius of the proposed works, from within the last six months at the time of writing (27th December 2022 – 27th June 2023). This search identified six planning application, as follows:

- C23/0500/00/AC (Removal/Variation of Condition(s)): Vary condition 5 on planning permission C21/0575/00/LL so that 3 of the dwellings must be used for residential use within class C3 and 3 of the dwellings used for either use class C3 or use class C6. Approximately 750m NW of the proposed works.

[41] Gwynedd Council Planning Applications (accessed June 2023) https://amg.gwynedd.llyw.cymru/planning/index.html?language=en&fa=search

- C23/0427/00/AC (Removal/Variation of Condition(s)): Variation of condition 2 on planning permission C17/0069/00/LL in order to change the design of the proposed house. Approximately 1.6km N of the proposed works.
- C23/0393/00/DT (Householder Planning): Rear extensions to kitchen and utility room, new porch to side, new bay windows to front and left elevations, bifold doors to front, new dormer window with Juliet balcony to front elevation, new window to kitchen (right side) new window to bedroom (right side) and dropped kerb to driveway entrance to main road. Approximately 1.8km N of the proposed works.
- C23/0241/00/DT (Householder Planning): Enlarge side extension by 1.6meters, external wall insulation and re-rendering, new sun tunnel, new PV panels, new window and roof light. Approximately 256m N of the proposed works.
- C23/0121/00/LL (Full Planning): Full planning application (change of use) for the location of 9 short stay overnight bays for motorhomes. Approximately 100m N of the proposed works.
- C23/0001/00/DT (Householder Planning): New garage (re-location of garage approved as part of application C15/1280/00/LL). Approximately 230m NE of the proposed works.

With the exception of C23/0001/00/DT, the nature of the works for all applications do not present a significant effect to any ecological resources. As such, no cumulative effects are predicted with these applications.

For application C23/0001/00/DT, an ecological survey report[42] was uploaded in support of the application which identified potential impacts in the absence of mitigation on badgers, bats (in particular, disturbance to night-roosting lesser horseshoe bats and to foraging and commuting bats), hedgehogs, breeding birds and reptiles (in particular adder and slow worm). Mitigation measures were proposed within the report to avoid impacts to these ecological resources sufficiently that they would not result in cumulative significant effects with the proposed works.

7.5 Compensation

No significant residual effects were identified through the assessment of effects and following implementation of mitigation measures. As such, no compensation measures are required.

8. Enhancement

It is recommended that enhancement measures are considered for integration into the detailed design in accordance with Section 6 [Environment (Wales) Act 2016] duties to conserve and enhance. Of particular relevance are eco-engineering enhancements. These can be incorporated into new built structures but also existing structures as part of remedial works or retrofitted, with the aim to enhance biodiversity of new and/or existing coastal structures.

Key legislative drivers requiring the delivery of marine biodiversity enhancements include:

- Environment (Wales) Act 2016.
- National Strategy for Flood and Coastal Erosion Risk Management (FCERM)
- Welsh National Marine Plan
- Natural Resources Policy

[42] Cambrian Ecology Ltd (2023) Ecological Survey Report Caefadog, Barmouth. Proposed Garage Construction.

- Well-Being of Future Generations Act 2015

The materials used in structures can be selected to promote biodiversity. This could include using natural rock for rock armour, similar to local habitats, softer rock that may weather more readily, or lower carbon concretes with recycled components that can reduce the environmental footprint of construction, while providing substrates with significantly more effective colonisation potential (*less alkaline surface – better colonisation*) than standard concrete. Eco-engineering may also help to support reduced flood risk through increasing erosion resilience, as well as improve the visual aesthetic and educational value of coastal defence structures for coastal users.

Options for ecoengineering enhancements on the re-engineered seawall (Frontage 1) itself are limited due to heritage setting constraints and high position in the intertidal. However, the existing and new rock armour at the foot of the wall is suitable for enhancement in the form of creating artificial water retaining depressions or holes on the rocks. The number of holes/depressions will be confirmed at a later date. These features would retain water at low tide, with the potential to support greater number of species compared to adjacent surfaces.

Rockpool units could also be installed at the lower elevations of rock armour deployment. These low alkalinity concrete tidal pools retain water at low tide and improve biodiversity through an increase in habitat heterogeneity. Integration of units such as Econcrete: Tide Pool Armour or similar are recommended as they can be integrated into the detailed design whilst concomitantly delivering marine biodiversity enhancement.

The new outfall concrete encasement is deemed suitable for integration of a textured/grooved surface to enhance the growth of intertidal species. The textured features can be imprinted in precast elements which can be retrofitted or cast in-situ using textured formwork. This intervention has the potential to increase species abundance and algal species diversity. Care should be taken to ensure the aesthetic appeal of this enhancement. There is also potential for the encasement to be built using a concrete mix that enhances the growth of marine flora and fauna (lower alkalinity concrete mix). This would have potential to increase colonisation rate and increase species richness acting as a suitable offsetting / enhancement measure.

Frontage 2 wall may be suitable for the addition of purpose made bolt on precast vertical pools (such as Vertipools). Vertipools[43] are cast marine concrete unit products designed to be attached to sea defences to retain seawater as the tide recedes. These structures have the capacity to provide habitat where previously there was little water-retaining habitats and could support locally significant populations.

The above interventions are relatively straightforward and cost effective and have the potential to support greater biodiversity and facilitate climate change resilience through supporting biodiverse ecosystems, whilst maintaining compliance with duties and drivers to provide nature-based solutions that enhance local biodiversity and increase ecosystem resilience.

Further enhancements, including those detailed in the PEA, should include: the installation of planters and insect hotels within amenity grasslands to increase and protect biodiversity of local species within an urban environment; ecological enhancement products suitable for urban environments that are available[44] and replacement of non-native ornamental shrubs with native planting.

A DECCA assessment and ecosystems assessment will be completed for the project prior to applying for full planning permission, and this EcIA updated accordingly.

[43] https://www.artecology.space/vertipools/

[44] For example Vestre Pile bench allows large stones and gravel to be easily arranged into small piles < https://vestre.com/uk/products/habitats/habitats-pile> [Accessed 19/06/2023]

9. Monitoring and Management

No significant residual effects are predicted and, as such, no specific monitoring is required as a result of this assessment. However, monitoring requirements may be required as specified within any NRW development licences, if necessary. Detailed methods and timing of monitoring would be detailed within the necessary NRW development licence.

10. Conclusions

This EcIA has been produced to assess the ecological impacts and establish mitigation required in relation to the proposed works. The proposed works comprise the rebuilding of the existing sea wall, construction of a new raised section of seawall, redistribution of existing 'temporary' rock armour, new surface water outfall, removal of the existing outfall and pipe, single and double leaf flood gates, control box, new setback wall, new gulleys and chambers, replacement of existing paviors, removal existing stub walls and railings, paved area incorporated into viaduct gardens and new railings around viaduct gardens.

An extended Phase 1 habitat survey was conducted in February 2022 and an intertidal biotope survey was conducted in March 2022 to establish the baseline ecological conditions of the site. Desk study information from Cofnod and other online resources were also consulted. The field surveys and desk study information have indicated the confirmed or potential (*i.e.*, suitable habitat) presence within the zone of influence of statutory and non-statutory designated sites, higher value intertidal habitats and lower value terrestrial habitats, foraging, commuting and roosting bats, foraging and commuting otter and badger, hedgehog, polecat, breeding birds, reptiles, terrestrial and aquatic invertebrates, fish and a marine INNS (Darwin's barnacle).

All ecological resources present at the site have been evaluated in line with the guidance set out in the CIEEM Guidance for Ecological Assessment. Impacts during construction and operation have then been assessed and the necessary mitigation measures have been specified. The mitigation measures required include pollution, sedimentation and dust control measures, sensitively timed and phased vegetation clearance and sensitively timed works within the intertidal zone. All mitigation measures outlined within this EcIA relating to construction should be incorporated into the CEMP.

Following incorporation of the specified mitigation measures during both construction and operation, no significant negative residual effects are predicted on the ecology and nature conservation interest of the site and surrounding area from the proposed works. Furthermore, the included mitigation would ensure that no breaches of relevant legislation are likely to occur. No additional compensation or monitoring measures are therefore required.

A cumulative effects assessment was also conducted which predicted no cumulative effects on ecological resources as a result of the proposed works and other plans or projects within the zone of influence.

The report has been written as the result of survey efforts undertaken in February/March 2022. This report refers within the limitations stated, to the condition or proposed development of the site at the time of inspections. Changes in legislation, guidance, best practice, etc. may necessitate a re-assessment/re-survey. It is also advised that if there is a delay of over 18 months in undertaking the proposed works, update surveys may be required as per best practice guidelines[45]. No warranty is given as to the possibility of future changes in the condition of the site.

This report is produced solely for the benefit of YGC and no liability is accepted for any reliance placed on it by any other party. This report is prepared for the proposed uses stated in the report and should not be used in a different context.

[45] CIEEM (2019) On the Lifespan of Ecological Reports & Surveys

Figures

Figure 1a Site Location Plan
Figure 1b Site Location Plan
Figure 2 Designated sites: Statutory and non-statutory designated sites
Figure 3 Extended Phase 1 Habitat Survey results



Nodiadau / Notes

A3

1. This drawing is to be read in conjunction with all other drawings, specifications and contract documents. Notify the *Project Manager* of any discrepancies.
2. All dimensions in millmetres and all levels in metres above ordnance datum unless noted otherwise.
3. Do not scale from drawing.

Red line boundary

Coordinate System: British National Grid

Hanes Fersiwn / Version History

P01	28/06/23	RSJ	RC	NH	

Rev	Date	By	Chkd	Appd	Authd

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Enw a Rhif y Prosiect CG / GC Project Name and Number

Cynllun arfordirol Gerddi Traphont

Viaduct Gardens Coastal Scheme

Teitl Lluniad / Drawing Title

Site Location Plan

Graddfa yn A3 / Scale at A3

1:25,000

Rhan / Role

Addasrwydd / Suitability	Statws / Status
S4	P01
Rhif y Prosiect Arup / Arup Project Number	Adolygiad / Rev
28569900	

Rhif Lluniad / Drawing Number

Figure 1a

Mae'r cynllun a'r lluniad yma yn gyfrinachol. Mae pob hawl oddi fewn iddo yn cynnwys yr hawlfraint yn eiddo i Cyngor Gwynedd ac ni ddylid ei ddatgelu i erail na'i atgynhyrchu geb ganiatad ymlaen llaw gan Cyngor Gwynedd 2022.
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Nodiadau / Notes

A3

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- Red line boundary
- Harbour spillway - access route
- Frontage 1
- Frontage 2

Coordinate System: British National Grid

Hanes Fersiwn / Version History

Rev	Date	By	Chkd	Appd	Awdd
P01	30/06/23	RSJ	RC	NH	

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Viaduct Gardens Coastal Scheme

Teitl Lluniad / Drawing Title

Site Location Plan

Graddfa yn A3 / Scale at A3

1:2,500

Rhan / Role

Addasrwydd / Suitability	Statws / Status
S4	P01
Rhif y Prosiect Arup / Arup Project Number: 28569900	Adolygiad / Rev

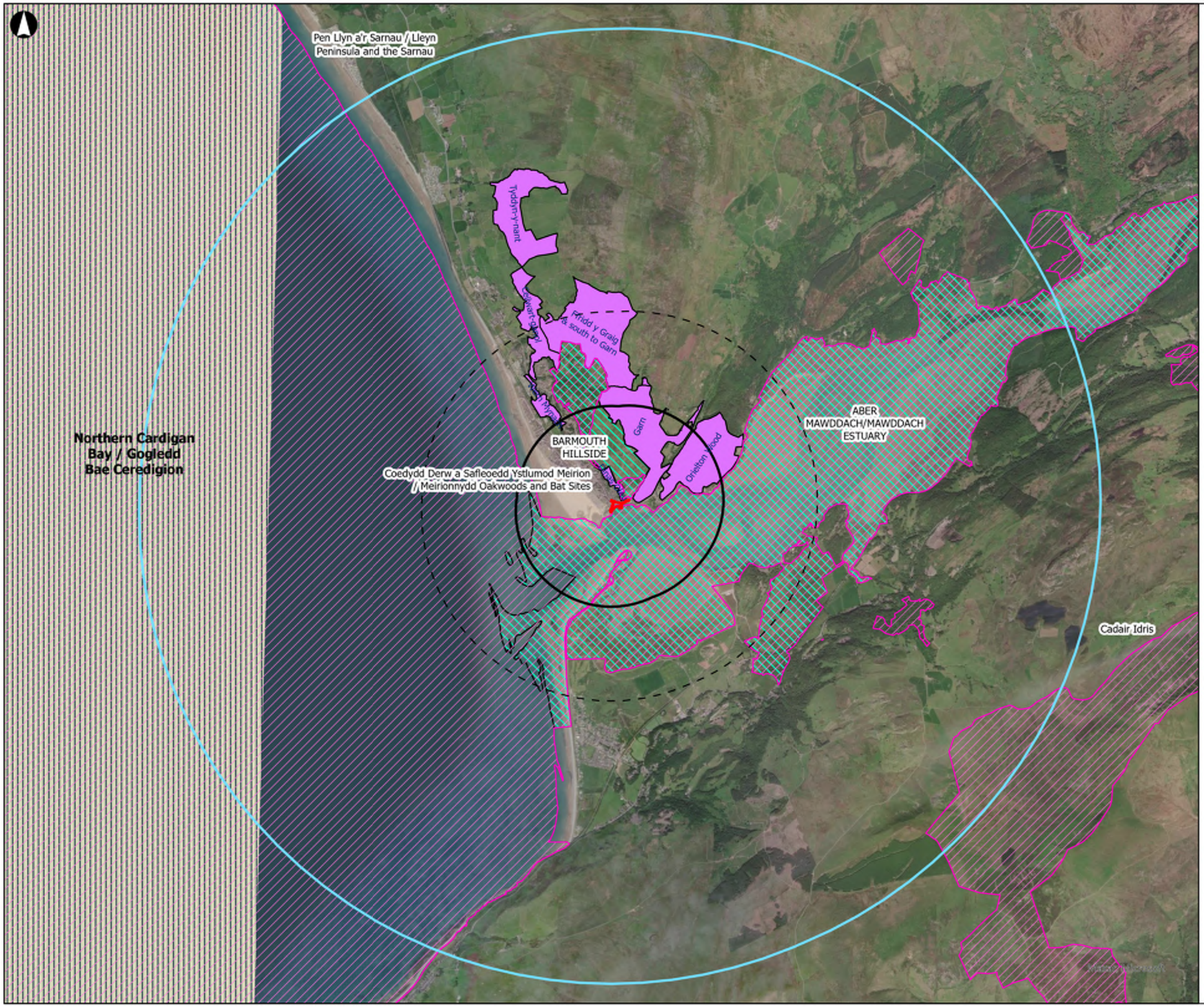
Rhif y Lluniad / Drawing Number

Figure 1b

Mae'r cynllun a'r lluniad yma yn gyfrinachol. Mae pob hawl oddi fewn iddo yn cynnwys yr hawlfraint yn eiddo i Cyngor Gwynedd ac ni ddylid ei ddatgelu i erail na'i atgynhyrchu geb ganiatad ymlaen llaw gan Cyngor Gwynedd 2022.
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A3

30/06/2023 14:13

- Red line boundary
- 1km buffer
- 2km buffer
- 5km buffer
- Site of Importance for Nature Conservation (SINC)
- Site of Special Scientific Interest (SSSI)
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)

Coordinate System:
British National Grid

Kilometres

0 0.5 1 2

Rev	Date	By	Chkd	Appd	Authd
P02	30/06/2023	RSJ	RC	NH	

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Client
YGC Gwynedd Council

Project Name
Barmouth Flood Alleviation Scheme Viaduct Gardens

Drawing Title
Statutory and non-statutory designated sites

Scale at A3
1:39,000

Role
Ecology

Suitability
For Information

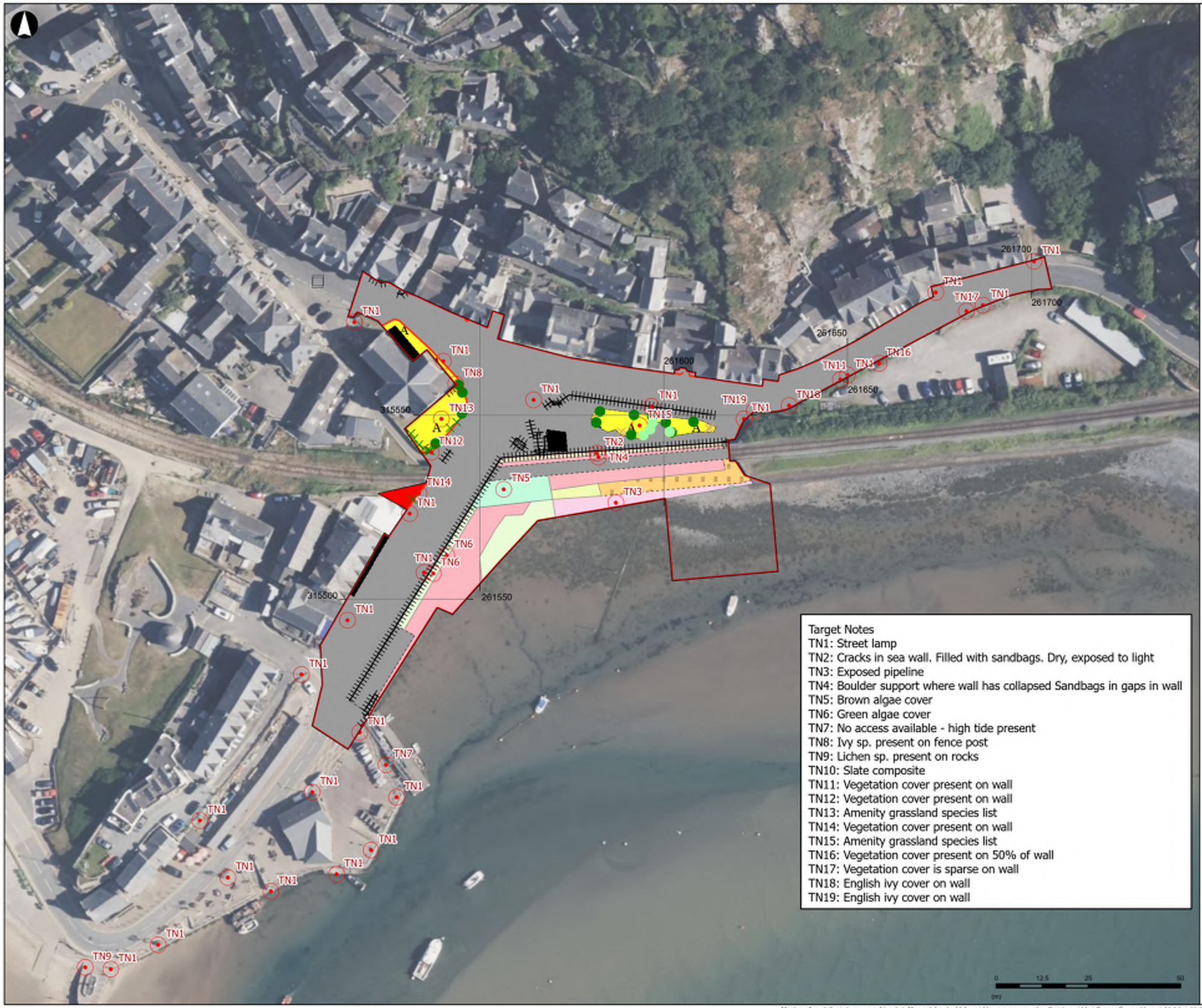
Project Number
285699

Rev
P02

Drawing Number
Figure 2

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Target Notes
TN1: Street lamp
TN2: Cracks in sea wall. Filled with sandbags. Dry, exposed to light
TN3: Exposed pipeline
TN4: Boulder support where wall has collapsed Sandbags in gaps in wall
TN5: Brown algae cover
TN6: Green algae cover
TN7: No access available - high tide present
TN8: Ivy sp. present on fence post
TN9: Lichen sp. present on rocks
TN10: Slate composite
TN11: Vegetation cover present on wall
TN12: Vegetation cover present on wall
TN13: Amenity grassland species list
TN14: Vegetation cover present on wall
TN15: Amenity grassland species list
TN16: Vegetation cover present on 50% of wall
TN17: Vegetation cover is sparse on wall
TN18: English ivy cover on wall
TN19: English ivy cover on wall

Nodiadau / Notes

A3

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2. All dimensions in millmetres and all levels in metres above ordnance datum unless noted otherwise.
3. Do not scale from drawing.

Red line boundary
Redline Boundary
Phase 1 Point
A2.2 - Scrub-scattered
A3.1 - Broad-leaved parkland/scattered trees
A3.2 - Coniferous parkland/scattered trees
J1.4 - Introduced shrub
J5 - Gravel and concrete
TN - Target note
Phase 1 Line
J2.4 - Fence
J2.5 - Wall
Phase 1 Area
H1.1 - Intertidal - mud/sand
H1.1.3 - Intertidal - mud/sand - brown algal beds
H1.2 - Intertidal - shingle/cobbles
H1.2.2 - Intertidal - shingles/cobbles - green algal beds
H1.3 - Intertidal - boulders/rocks
H1.3.3 - Intertidal - boulders/rocks - brown algal beds
H1.4.1 - Other exposure - acid/neutral
J1.2 - Cultivated/disturbed land - amenity grassland
J1.4 - Introduced shrub
J3.5 - Artificial sea wall
J3.6 - Buildings
J5 - Gravel/hard standing
Coordinate System: British National Grid

Hanes Fersiwn / Version History

Rev	Date	By	Chkd	Appd	
P01	28/06/2023	HG	CE	RC	

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Cynllun arfordirol Gerddi Traphont
Viaduct Gardens Coastal Scheme

Teitl Lluniad / Drawing Title
Extended Phase 1 Habitat Plan

Graddfa yn A3 / Scale at A3
1:1,000

Addasrwydd / Suitability	Statws / Status
S4	**Approved**
Rhif y Prosiect Arup / Arup Project Number	Adolygiad / Rev
28569900	**P01**

Rhif Lluniad / Drawing Number
Figure 3

Mae'r cynllun a'r lluniad yma yn gyfrinachol. Mae pob hawl oddi fewn iddo yn cymwys yr hawlfraint yn eiddo i Cyngor Gwynedd ac ni ddylid ei ddatgelu i eraill nah atgynhyrchu neb ganiatad ymlaen llaw gan Cyngor Gwynedd 2022.
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Appendix A

Legislation and Policy

A.1 Relevant Legislation

A framework of international, European, national and local legislation and planning policy guidance exists to protect and conserve wildlife and habitats. The following core legislation exists to protect habitats and species of nature conservation importance.

This is described in the following sections.

A.1.1 Designated Sites

A network of nationally designated sites has been established through the designation of Sites of Species Scientific Interest (SSSI) under the Wildlife and Countryside Act 1981 (as amended). The protection afforded by the Act means it is an offence to carry out or permit to be carried out any operation listed within the notification without the consent of the Statutory Nature Conservation Organisation[46] (Natural England). The protection afforded to SSSIs is used to underpin the designation of areas at a European Level. European Sites comprise:

- Special Areas of Conservation (SAC) designated under the Conservation of Habitats and Species Regulations 2019 (Amendment) (EU Exit) (known as the Habitats Regulations);
- Special Protection Areas (SPA) designated under the Wildlife and Countryside Act.

Wetlands of International Importance (Ramsar sites) declared under the Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 are normally also notified as SSSIs but are only considered European Sites as a matter of UK and Local Government Policy.

The Habitats Regulations transpose the requirements of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) into law within England and Wales, while the Wildlife and Countryside Act transposes Directive 79/409/EEC on the Conservation of Wild Birds (the Birds Directive) in the law within England and Wales. Equivalent legislation exists to transpose these directives in the law within Scotland and Northern Ireland.

The Habitats Regulations require that consideration is given to the implications of plans and projects (developments) on European Sites are considered. Specifically, Regulation 61(1) states:

"A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which –

(a) is likely to have a significant effect on a European site or European marine site (either alone or in combination with other plans or projects); and

(b) is not directly connected with or necessary to the management of that site, must make an appropriate assessment of the implications for that site in view of that site's conservation objectives."

The formal consideration of effects on European Sites is therefore undertaken by the determining authority such as the Local Planning Authority.

Local Nature Reserves can be given protection against damaging operations through powers within the National Parks and Access to the Countryside Act 1949 (as amended). However, this protection is usually conveyed through inclusion of protection within local planning policy relating to these sites and other non-statutory sites such as sites of Importance for Nature Conservation.

[46] Section 28 of the Wildlife and Countryside Act 1981 (as substituted by Schedule 9 of the Countryside and Rights of Way Act 2000).

These sites are protected by the relevant legislation regardless of whether planning permission is required. Where planning consent is required, they will also be protected by Planning Policy.

Country Parks, Sites of Importance for Nature Conservation (SINC), and Ancient Woodlands are protected by Planning Policy, which will apply to schemes which require planning consent.

A.1.2 Protected and Notable Species

A.1.2.1 European Protected Species

The Habitats Regulations convey special protection to a number of species which are listed in schedule 2 of the Regulations and are referred to a European Protected Species (EPS):

- All UK resident bat species;
- All whale and dolphin species;
- Large blue butterfly (*Maculinea arion*);
- Hazel dormouse (*Muscardinus avellanarius*);
- Pool frog (*Rana lessonae*);
- Sand lizard (*Lacerta agi*lis);
- Fisher's estuarine moth (*Gortyna borelii lunata*);
- Great crested newt (*Triturus cristatus*)
- European otter (*Lutra lutra*);
- Wild cat (*Felis silvestris*);
- Lesser Whirlpool Ram's-horn Snail (*Anisus vorticulus*);
- Smooth snake (*Coronella austriaca*);
- Sturgeon (*Acipenser sturio*);
- Natterjack toad (*Bufo calamita*); and
- All marine turtles.

Regulation 41 makes it an offence to:

a) Deliberately capture, injure or kill any wild animal of a EPS;

b) Deliberately disturb wild animals of such a species;

c) Deliberately takes or destroys the eggs of such a species; and

d) Damages or destroys a breeding site or resting place of such an animal.

Disturbance in the context of the offences above is disturbance which is likely to impair the ability of the animals to survive, to breed or reproduce, to nurture their young, to hibernate, to migrate; or to affect significantly the local distribution of the species.

Licences can be granted by the relevant SNCO for developments (sometime referred to as EPS Licences or Derogation Licences) providing the purposes of the licence is for *"preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment".*

A.1.2.2 UK Protected Species

A.1.3 Conservation of Habitats and Species Regulations 2017 (as amended)

The Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitats Regulations') transpose the previous requirements of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) into law within England and Wales. These regulations provide for the designation and protection of sites of European importance known as European Sites under the National Site Network[47].

European Sites comprise:

- Special Areas of Conservation (SACs), including candidate sites, designated under the Conservation of Habitats and Species Regulations 2017 (as amended)[48].
- Special Protection Areas (SPAs) including candidate sites, designated under the Wildlife and Countryside Act 1981 (as amended)[49].
- Ramsar Sites designated under the Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 are also considered as European Sites as a matter of UK Government policy along with proposed SACs and SPAs.

The Habitats Regulations require that consideration is given to the implications of plans and projects (developments) on European Sites. Specifically, Regulation 63(1) states:

a) "A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which:

i. is likely to have a significant effect on a European site or European marine site (either alone or in combination with other plans or projects), and

ii. is not directly connected with or necessary to the management of that site.

b) must make an appropriate assessment of the implications for that site in view of that site's conservation objectives".

The formal consideration of effects on European Sites is therefore undertaken by the determining authority such as the Local Planning Authority under the Town and Country Planning Act 1990. The determining authority is known as the Competent Authority with the Regulations.

The Habitats Regulations also convey special protection to a number of species, which are listed in Schedule 2 of the Regulations and are referred to as European Protected Species (EPS). Regulation 43 makes it an offence to:

- Deliberately capture, injure or kill any wild animal of a EPS;
- Deliberately disturb wild animals of such a species;
- Deliberately take or destroy the eggs of such a species;
- Damage or destroy a breeding site or resting place of such an animal.

Disturbance in the context of the offences above is disturbance, which is likely to impair the ability of the animals to survive, to breed or reproduce, to nurture their young, to hibernate, to migrate; or to significantly affect the local distribution of the species.

Licences can be granted by the relevant Statutory Nature Conservation Organisation (SNCO) for developments (sometime referred to as EPS Licences or Derogation Licences) providing the purposes of the licence is for "*preserving public health or public safety or other imperative reasons of overriding public*

[47] These were also formerly known as Natura 2000 Sites

[48] The Habitats Regulations transposes the requirements on Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora in to UK law.

[49] The Wildlife and Countryside Act 1981 transposes the requirements of Directive 79/409/EEC on the Conservation of Wilde Birds (Birds Directive) in to UK law. The Birds Directive has been updated through Directive 2009/147/EC on the Conservation of Wild Birds.

interest including those of a social or economic nature and beneficial consequences of primary importance for the environment".

A.1.3.1 Ramsar Convention 1971

Wetlands of International Importance (Ramsar Sites) declared under the Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 are considered European Sites as a matter of UK and Local Government Policy.

A.1.3.2 Wildlife and Countryside Act 1981 (as amended)

A network of nationally designated sites has been established through the designation of Sites of Special Scientific Interest (SSSIs) under the Wildlife and Countryside Act 1981. The protection afforded by the Act means it is an offence to carry out or permit to be carried out any operation listed within the notification without the consent of the Statutory Nature Conservation Organisation (Natural Resources Wales). The protection afforded to SSSIs is used to underpin the designation of areas at a European Level.

The Wildlife and Countryside Act also places obligations on Welsh Ministers and other public bodies with regard to the conserving and enhancing of the features of SSSIs in the exercise of their functions.

The Wildlife and Countryside Act 1981 provides protection to both EPSs and other species including wild birds, water voles and reptiles.

All wild birds, their nests and eggs are protected, with some rare species afforded extra protection from disturbance during the breeding season (these species are listed in Schedule 1 of the Act). It is illegal to take any wild bird or damage or destroy the nests and eggs of breeding birds. There are certain exceptions to this in respect of wildfowl, game birds and certain species that may cause damage.

In England and Wales water voles are listed on Schedule 5 of the Wildlife and Countryside Act 1981, receiving full protection since 2008. The Wildlife and Countryside Act 1981 together with amending legislation, lists the following offences:

- Intentionally killing, injuring or taking a water vole by any method.
- Intentionally or recklessly damaging or destroying a water vole place of shelter or protection.
- Intentionally or recklessly damaging disturbing a water vole whilst it is occupying such a structure or place it uses for shelter or protection.
- Intentionally or recklessly obstructing access to a water vole's place of shelter or protection.
- Selling, offering for sale, or possessing or transporting for the purposes of sale, any live or dead water vole, or any part or derivative, or advertising any of these for buying or selling.

All native reptile species in the UK are subject to partial protection from intentional or reckless killing or injury only.

The Act also includes provisions for the control of invasive non-native species (INNS). Under these provisions it is an offence to:

- Release or allow to escape into the wild any animal which is not ordinarily resident or a regular visitor to Great Britain, or is included in Schedule 9 of the Act.
- Plant or otherwise cause to grow in the wild any plant which is included in Schedule 9 of the Act.

People undertaking works in proximity to invasive non-native plant species should take all reasonable steps and exercise all due diligence to avoid committing an offence.

A.1.3.3 The Invasive Alien Species (Enforcement and Permitting) Order 2019

The Invasive Alien Species (Enforcement and Permitting) Order 2019 came in to effect on 1st December 2019. This allows for the enforcement of the European Union (EU) Invasive Alien Species Regulation 1143/2014 on the prevention and management of invasive alien plant and animal species in England and Wales, including the relevant licenses, permits and rules for keeping invasive alien species.

This Order is similar to existing EU legislation, but there are a number of changes that apply to regulated species. If it is not a species of EU concern, then the Wildlife & Countryside Act (WAC; Section 14, Schedule 9) still applies.

Those working with in-scope plants need to be aware that the movement of live plants, or propagules, are covered by the Order – so, unless plants, or parts of plants are being moved for the purpose of eradication, then a licence would be needed from Natural Resources Wales (NRW) to carry this action out.

It is an offence under Part 2 Article 3 (2) to:

> *'release or allow to escape into the wild any specimen which is of a species of animal which (a)is not ordinarily resident in and is not a regular visitor to Great Britain in a wild state, or (b) is included in Part 1 of Schedule 2'.*

It is also an offence under Part 2 Article 3 (3) to:

> *'plant or otherwise cause to grow in the wild any specimen which is of a species of plant which is included in Part 2 of Schedule 2'.*

Part 1 of Schedule 4 of the Order also amends the Wildlife and Countryside Act 1981 (as amended) to remove the animals and plants listed on Part 1, Schedule 2 of the Order from Schedule 9 of the Wildlife and Countryside Act.

A.1.3.4 National Park and Access to the Countryside Act 1949 (as amended)

Local Nature Reserves (LNRs) can be given protection against damaging operations through powers within the National Parks and Access to the Countryside Act 1949. However, this protection is usually conveyed through inclusion of protection within local planning policy relating to these sites and other non-statutory sites such as Sites of Importance for Nature Conservation (SINCs).

A.1.3.5 Hedgerow Regulations 1997

The Hedgerow Regulations 1997 set out a framework for the protection of hedgerows against removal where they are deemed to be important either due to their age, ecological or archaeological features. Approval is required from the local authority prior to the removal of hedgerows. Local authorities can enforce the retention of Important Hedgerows through the issuing of Retention Notices.

A.1.3.6 The Protection of Badgers Act 1992

Badger (*Meles meles*) and their setts are protected under the Protection of Badgers Act 1992 which makes it an offence to kill, injure or take a badger, or interfere with a sett.

A.1.3.7 Wild Mammals (Protection) Act 1996

This Act operates in parallel with the legislation listed above conferring specific protection on rare or threatened mammal species by protecting all wild mammals from any action intended to cause unnecessary suffering.

A.1.3.8 Salmon and Freshwater Fisheries Act 1975 (as amended)

The Salmon and Freshwater Fisheries Act (SAFFA) is legislation that aims to protect freshwater fish, with a particularly strong focus on salmon (*Salmo salar*) and trout (*Salmo trutta*). The legislation covers a broad range of topics, but of particular relevance to development are those sections covering water pollution, habitat disturbance and fish migration routes.

Under Section 2 (4) it is an offence to wilfully disturb spawn, spawning fish or spawning areas and under Section 4 (1) it is an offence to knowingly permit the flow of poisonous matter and polluting effluents into river courses that are poisonous or injurious to fish or the spawning grounds, spawn or food of fish.

Sections 9 to 15 are concerned with fish passage and migration routes. It is the duty of the waterway owner that when constructing dams, screens or sluices to provide and maintain a facilitating fish pass for migrating salmon or trout. Section 9 allows the regulator to serve notice on the owner or occupier of a dam or obstruction, to install a fish pass where necessary. This section applies to dams which are either new or have

been altered to create an increased obstacle to the passage of migratory salmonids. It is also applicable where dams in a state of disrepair have been rebuilt over at least one half of their length.

A.1.3.9 Eels (England and Wales) Regulations 2009

This implements Council Regulation (EC) No 1100/2007 of 18 September 2007 establishing measures for the recovery of the stock of European eel (*Anguilla anguilla*). The regulations are focussed on the management of commercial eel fisheries (licences, catch returns and restocking) and the passage/migration of eels. The regulations afford powers to the regulators (Environment Agency and SNCO i.e. Natural Resources Wales) to implement eel recovery measures in all freshwater and estuarine waters in England and Wales.

Part 4 of the regulations is concerned with the passage of eels and makes it a legal requirement to notify the regulator of the construction, alteration or maintenance of any structure likely to affect the passage of eels. This include water intakes and outfalls, dams and weirs, sluices or any other in-river obstruction. Where any such structure exists, the owner, occupier or person in charge of the land on which the dam, structure or obstruction lies may be required to construct and operate an eel pass to allow the free passage of eels.

A.1.3.10 The Environment (Wales) Act 2016

The Environment (Wales) Act 2016 places a duty on public bodies in Wales to conserve and enhance biodiversity in the exercise of their functions. This duty includes consideration of the 'resilience of ecosystems' in terms of their diversity, extent, condition and connectivity. The Act also reinforces duties in relation to the lists of species and habitats of importance and the duties to conserve and enhance those species and habitats. Within this EcIA these are referred to as Section 7 Habitats and Species unless covered under other legal protections.

A.1.3.11 The Well-being of Future Generations Act (2015)

This Act places a duty on public bodies in Wales to carry out sustainable development. In this Act "sustainable development" means the process of improving the economic, social, environmental and cultural well-being of Wales by taking action, in accordance with the sustainable development principle, aimed at achieving the well-being goals.

The action a public body takes in carrying out sustainable development must include:

- Setting and publishing objectives ("well-being objectives") that are designed to maximise its contribution to achieving each of the well-being goals, and
- Taking all reasonable steps (in exercising its functions) to meet those objectives.
- The seven well-being goals include: a resilient Wales, a prosperous Wales, a healthier Wales, a more equal Wales, more cohesive communities, a Wales of vibrant culture and thriving Welsh language and a globally responsible Wales.

Of most relevance is 'A resilient Wales', which seeks to maintain and enhance a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).

A.1.4 Planning Policy

A.1.4.1 Future Wales – the National Plan 2040

Future Wales – the National Plan 2040[50] is the national development framework for Wales, setting the direction for development in Wales to 2040. It is a development plan with a strategy for addressing key national priorities through the planning system, including sustaining and developing a vibrant economy, achieving decarbonisation and climate-resilience, developing strong ecosystems and improving the health and well-being of our communities. As the national development framework, Future Wales is the highest

[50] Update to Future Wales - The National Plan 2040 (gov.wales)

tier of development plan and is focused on solutions to issues and challenges at a national scale. Its strategic nature means it does not allocate development to all parts of Wales, nor does it include policies on all land uses. It is a framework which will be built on by Strategic Development Plans at a regional level and Local Development Plans at local authority level.

Welsh Government has also produced a Nature Recovery Action Plan[51] which is aimed at addressing the underlying causes of biodiversity loss by putting nature at the heart of its decision-making, by increasing the resilience of Wales' natural systems (ecosystems), and by taking specific action for habitats and species. It sets out how Wales will deliver the commitments of the EU Biodiversity Strategy and the UN Convention on Biological Diversity to halt the decline in our biodiversity by 2020 and then reverse that decline. The Nature Recovery Action Plan links to and complements The Well-being of Future Generations (Wales) Act 2015 and the Environment Act (Wales) 2016. Developments should seek to complement this, in order to meet objectives set out in the Environment Act and Well-being Act.

A.1.4.2 Planning Policy Wales (2021)

Planning Policy Wales[52] sets the national policies in relation to development control through the Town and Country Planning Act 1990. This is supported by a series of Technical Advice Notes, with Technical Advice Note (TAN) 5[53] being of particular relevance to this chapter as it sets out the consideration of nature conservation in the determination of planning applications.

At national level, Chapter 6 of Planning Policy Wales[54] (which relates to conserving and enhancing the natural environment) requires development plan strategies, policies and development proposals to consider the need to:

- support the conservation of biodiversity, in particular the conservation of wildlife and habitats;
- ensure action in Wales contributes to meeting international responsibilities and obligations for biodiversity and habitats;
- ensure statutorily and non-statutorily designated sites are properly protected and managed;
- safeguard protected and priority species and existing biodiversity assets from impacts which directly affect their nature conservation interests and compromise the resilience of ecological networks and the components which underpin them, such as water and soil, including peat; and
- secure enhancement of and improvements to ecosystem resilience by improving diversity, condition, extent and connectivity of ecological networks.

Developers must ensure that they comply with the above legislation by fully assessing the potential impacts on protected species and habitats from the proposed development. Where planning permission is required, this assessment must be finalised prior to and included with the submission of the planning application. The Planning Authority can then ensure that the necessary protected species and habitats information has been provided to inform an assessment and that proposals are in full accordance with relevant legislation and planning policy.

A recent letter from Welsh Government to the Heads of Planning[55] has strengthened the requirement for Local Planning Authorities to ensure a net benefit for biodiversity in all planning applications. Consequently, unless other significant material considerations indicate otherwise, there is a risk that planning permission may be refused in the absence of biodiversity enhancement.

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[51] Nature recovery action plan | GOV.WALES

[52] Welsh Government (2018) Planning Policy Wales

[53] Welsh Assembly Government (2009) Technical Advice Note 5: Nature Conservation and Planning. Cardiff

[54] Welsh Government Planning Policy Wales Edition 11. February 2021. Planning Policy Wales - Edition 11 (gov.wales)

[55] https://gov.wales/sites/default/files/publications/2019-11/securing-biodiversity-enhancements.pdf

A.1.4.3 Nature Recovery Action Plan 2015

Welsh Government has produced a Nature Recovery Plan which is aimed at addressing the underlying causes of biodiversity loss by putting nature at the heart of its decision-making, by increasing the resilience of Wales' natural systems (ecosystems), and by taking specific action for habitats and species. It sets out how Wales will deliver the commitments of the EU Biodiversity Strategy and the UN Convention on Biological Diversity to halt the decline in our biodiversity by 2020 and then reverse that decline. The plan builds on Wales' ground-breaking new legislative framework The Well-being of Future Generations (Wales) Act 2015.

A.1.4.4 United Kingdom Biodiversity Action Plan (UK BAP)

In 1992 the UK signed the Convention on Biological Diversity at the Rio Convention pledging the UK to develop national strategies for the conservation and sustainable use of biological diversity. The UK Government subsequently produced Biodiversity: The UK Action Plan in 1994, which described the biological resources of the UK as a whole and in turn led to the production of Biodiversity Action Plans for individual habitats and species.
Biodiversity policy within the UK has been revised through the publication of the UK Post-2010 Biodiversity Framework (JNCC, 2012) which covers the period from 2011 to 2020. A total of 65 Priority Habitats and 1150 Priority Species have been identified as the most in need of protection. Such species and habitats present in Wales have been listed as species and habitats of principal importance for conservation in response to the requirements of the Environment (Wales) Act 2016. They are hereafter referred to as Section 7 (S7) species.

A.1.4.5 Wales Action Plan for Pollinators (2013)

The Action Plan for Pollinators in Wales recognises that: 'Pollinators are an essential component of our environment. Honey bees and wild pollinators including bumblebees, solitary bees, parasitic wasps, hoverflies, butterflies and moths and some beetles are important pollinators in Wales, for crops such as fruit and oil seed rape, clovers and other nitrogen fixing plants that are important to improving the productivity of pasture systems for livestock grazing, and wild flowers.'

The Welsh Government has worked with industry and stakeholders to look in more detail at the evidence and issues around pollinators and their conservation in Wales. Following consultation, an 'Action Plan for Pollinators in Wales' was launched setting the strategic vision, outcomes and areas for action to halt and reverse pollinator decline in Wales. This plan aims to reduce and reverse the decline in wild and managed pollinator populations, which includes bees, some wasps, butterflies, moths and hoverflies, some beetles and flies. A pollinator task force comprising of key stakeholders is now active and a draft implementation plan is in place.

Other Legislation Relating to Species

Public authorities listed in the Environment (Wales) Act 2016, including LPAs "*must seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in doing so promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions*".

Ecosystem resilience is defined as the capacity for ecosystems to adapt, and comprises the key characteristics:

- Diversity between and within ecosystems;
- The connections between and within ecosystems;
- The scale of ecosystems; and
- The condition of ecosystems (including their structure and functioning).

In complying with the Biodiversity and Resilience of Ecosystems Duty, it is necessary to have regard to:

- The list published under Section 7;

- The State of Natural Resources Report (SoNARR) published under Section 8[56]; and
- Any area statement published under Section 11 for an area that includes all or part of an area in relation to which the authority exercises functions.

Section 7 lists species and habitats which are 'of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales' (as decided by WG in consultation with Natural Resources Wales (NRW)).

Locally Protected Species which may be identified within County Local Biodiversity Action Plans (LBAP), the Royal Society for the Protection of Birds (RSPB) 'Birds of Conservation Concern' or Red Data books for example.

A.1.5 Local policy

Seven local planning policies are set out within the Joint Anglesey and Gwynedd Local Development Plan (LDP) (2011–2025)[57]. The current LDP encourages 'Conserving and Enhancing the Natural Environment' by recognising the statutory protection afforded to internationally and nationally designated landscapes, sites/ habitats and individual species. This LDP also acknowledges the key role of the planning system in protecting and enhancing the natural environment.

The current LDP is due to be updated with a Replacement Joint LDP, the review report has been published to inform the Replacement Joint LDP. Local policy is subject to change upon publication of the latest LDP.

Area statements have been produced detailing the key challenges that are faced in different localities across Wales. The North West Wales Area Statement[58] covers an extensive landscape of settlements, lowland and coastal areas, as well as upland areas (including Snowdonia National Park). The key challenge stakeholders identified in North West Wales is the climate and environment emergency with impacts of rising sea levels highlighted as a threat to vulnerable communities along the coast and severe droughts and increased frequency of wild fires causing additional stress of native wildlife and natural habitats. Further key themes identified relating to biodiversity included reconnecting people with nature, encouraging a sustainable economy, supporting sustainable land management and opportunities for resilient ecosystems.

As part of the Area Statements opportunities for biodiversity relating to the key challenges identified have included:

Using nature-based solutions to tackle climate change, such as improving management of forests and peatlands to increase greater storage of carbon and water;

Tapping into natural flood risk management to reduce the risk of flooding and coastal erosion to areas across the North West; and

To support flood defences there is an opportunity to build softer approaches that encourage natural flood management techniques, including: restoring degraded peatland, tree planting in the uplands and reinstating hedgerows. This will support biodiversity conservation and habitat connectivity.

A.1.5.1 Local development plan

The Joint Anglesey and Gwynedd Local Development Plan (LDP) (2011–2025)[59] includes a number of policies relating to nature conservation, in particular:

[56] https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en

[57] https://www.gwynedd.llyw.cymru/en/Council/Documents---Council/Strategies-and-policies/Environment-and-planning/Planning-policy/Anglesey-and-Gwynedd-Joint-Local-Development-Plan-Written-Statement.pdf [Last accessed: 05/06/2023]

[58] https://naturalresources.wales/about-us/area-statements/north-west-wales-area-statement/?lang=en [online] [Last Accessed: 05/06/2022]

[59] https://www.gwynedd.llyw.cymru/en/Council/Documents---Council/Strategies-and-policies/Environment-and-planning/Planning-policy/Anglesey-and-Gwynedd-Joint-Local-Development-Plan-Written-Statement.pdf [Last accessed: 05/06/2023]

Local Planning Policy	Summary
Strategic Policy PS 19: Conserving and where appropriate enhancing the natural environment	The Councils will manage development so as to conserve and where appropriate enhance the Plan area's distinctive natural environment, countryside and coastline, and proposals that have a significant adverse effect on them will be refused unless the need for and benefits of the development in that location clearly outweighs the value of the site or area and national policy protection for that site and area in question. When determining a planning application, consideration will need to be given to the following:- 1. Safeguard the Plan area's habitats and species, geology, history, the coastline and landscapes; 2. Protect or where appropriate enhance sites of international, national, regional and local importance and, where appropriate, their settings in line with National Policy; 3. Have appropriate regard to the relative significance of international, national or local designations in considering the weight to be attached to acknowledged interests, ensuring that any international or national responsibilities and obligations are fully met in accordance with National Policy; 4. Protect or enhance biodiversity within the Plan area and enhance and/or restore networks of natural habitats in accordance with the Local Biodiversity Action Plans and Policy AMG5; 5. Protect or enhance biodiversity through networks of green/ blue infrastructure; 6. Safeguard internationally, nationally and locally protected species; 7. Protect, retain or enhance the local character and distinctiveness of the individual Landscape Character Areas (in line with Policy AMG 2) and Seascape Character Areas (in line with Policy AMG 4); and 8. Protect, retain or enhance trees, hedgerows or woodland of visual, ecological, historic cultural or amenity value.
Policy AMG 1: Area of Outstanding Natural Beauty management plans	Proposals within or affecting the setting and/ or significant views into and out of the Areas of Outstanding Natural Beauty must, where appropriate, have regard to the relevant Area of Outstanding Natural Beauty Management Plan.
Policy AMG 2: Special landscape areas	When considering a proposal within Special Landscape Areas (SLA), as identified by the Proposals Map and listed below, there will be a need to appropriate consideration to the scale and nature of the development ensuring that there is no significant adverse detrimental impact on the landscape. The development should aim to maintain, enhance or restore the recognised character and qualities of the SLA. The proposal should have regard to the relevant 'Statement of Value and Significance'. Where appropriate, the Councils will require a Landscape and Visual Impact Assessment in order to consider the impact of the development on the designated area.

Local Planning Policy	Summary
	In exceptional circumstances, where development is necessary and could result in significant impact on the landscape, appropriate mitigation and compensation measures should be provided.
Policy AMG 3: Protecting and enhancing features and qualities that are distinctive to the local landscape character	Proposals that would have significant adverse impact upon landscape character as defined by the Landscape Character Areas included within the current Landscape Strategy for the relevant authority, must demonstrate through a landscape assessment how landscape character has influenced the design, scale, nature and site selection of the development. A proposal will be granted provided it doesn't have significant adverse impact upon features and qualities which are unique to the local landscape in terms of visual, historic, geological, ecological or cultural aspects. Measures should be taken to ensure that the development does not: 1. Cause significant adverse impact to the character of the built or natural landscape; 2. Fail to harmonise with, or enhance the landform and landscape; and 3. Lose or fails to incorporate traditional features, patterns, structures and layout of settlements and landscape of both the built and natural environment. Particular emphasis will be given to the landscapes identified by the Landscape Character Areas as being of high and outstanding quality because of a certain landscape quality or a combination of qualities. Additional consideration will also be given to development that directly affect the landscape character and setting of the AONBs or the National Park.
Policy AMG 4: Coastal protection	In considering a proposal on the coast, including the Heritage Coast, there will be a need to ensure that the proposal conforms to the following criteria:- 1. The development due to its nature must be located on the coast, or in open estuaries, or nearby, and that there is an overriding economic and social benefit from the development; 2. It does not cause unacceptable harm to: i) water quality; ii) public access considerations; iii) the built environment, or the landscape, or seascape character; and/ or iv) the area's biodiversity interests (including European Protected Areas such as marine Special Areas of Conservation and Special Protected Areas) due to their location, scale, form, appearance, materials, noise, or emissions or due to an unacceptable increase in traffic; 3. Priority is given to locations with a close visual connection to current buildings or existing structures; 4. There are no suitable alternative locations on the coast that have been developed; and

Local Planning Policy	Summary
	5. That the development is consistent with other policies within the Plan including Policy ARNA1.
Policy AMG 5: Local biodiversity conservation	Proposals must protect and, where appropriate, enhance biodiversity that has been identified as being important to the local area by: avoiding significant harmful impacts through the sensitive location of development; and considering opportunities to create, improve and manage wildlife habitats and natural landscape including wildlife corridors, stepping stones, trees, hedges, woodlands and watercourses. A proposal affecting sites of local biodiversity importance will be refused unless they can conform with all of the following criteria:- 1. That there are no other satisfactory alternative sites available for the development; 2. The need for the development outweighs the importance of the site for local nature conservation; and 3. That appropriate mitigation or compensation measures are included as part of the proposal. Where necessary, an Ecological Assessment which highlights the relevant local biodiversity issues should be included with the planning application.
Policy AMG 6: Protecting sites of regional or local significance	Proposals that are likely to cause direct or indirect significant harm to Local Nature Reserves (LNR), Local Wildlife Sites, or regionally important geological/ geomorphologic sites (RIGS) will be refused, unless it can be proven that there is an overriding social, environmental and/or economic need for the development, and that there is no other suitable site that would avoid having a detrimental impact on sites of local nature conservation value or local geological importance. When a development is granted, it will be necessary to ensure that there are appropriate mitigation measures in place. It will be possible to use planning conditions and/or obligations in order to safeguard the site's biodiversity and geological importance.

A.1.5.2 Local Biodiversity Action Plan

Natur Gwynedd is the Local Biodiversity Action Plan (LBAP) for Gwynedd outside the Snowdonia National Park[60].
The aims of Natur Gwynedd:

- To help conserve the biodiversity of Gwynedd and, thereby, contribute to biodiversity conservation in Wales, the UK and the world.
- To develop effective local partnerships to make sure that what they do will be maintained long term.

[60] Summary of the plan https://www.gwynedd.llyw.cymru/en/Council/Documents---Council/Strategies-and-policies/Environment-and-planning/Biodiversity/Natur-Gwynedd-Summary.pdf accessed through the website https://www.gwynedd.llyw.cymru/en/Council/Strategies-and-policies/Environment-and-planning/Natur-Gwynedd-Biodiversity-Action-Plan.aspx (Accessed 25/06/23).

- To increase our knowledge of Gwynedd's biodiversity.
- To raise public awareness of biodiversity in Gwynedd.

Habitat action plans are in place for: upland oakwoods, wet woodland, arable field margins, cloddiau, mudflats, maritime cliff and slopes, river corridors, rhos pasture, lowland heathland, upland heathland, lowland meadows and pasture, lowland dry acid grassland, lowland wetlands, strandlines and gardens.

Species action plans are in place for the following:

- Mammals: otter (*Lutra lutra*), pine marten (*Martes martes*), polecat (*Mustela putorius*), brown hare (*Lepus europaeus*), hazel dormouse (*Muscardinus avellanarius*), water vole (*Arvicola amphibius*), lesser horseshoe bat (*Rhinolophus hipposideros*);
- Birds: barn owl (*Tyto alba)*, chough (*Pyrrhocorax pyrrhocorax*), lapwing (*Vanellus vanellus*);
- Fish: arctic charr (*Salvelinus alpinus*), lampreys (*Petromyzontiformes sp*), salmonids;
- Reptiles: adder (*Vipera berus*);
- Invertebrates: marsh fritillary (*Euphydryas aurinia*), hornet robberfly (*Asilus crabroniformis*); and
- Plants and fungi: bluebell (*Hyacinthoides non-scripta*), floating water plantain (*Luronium natans*) and waxcaps (*Porpolomopsis spp*).

Appendix B

Design drawings

A1

Double leaf flood gate. Top of gate 5.30. Painted steel.

Existing paviors replaced with raised pedestrian crossing (blending).

Double leaf flood gate. Top of gate 5.30. Painted steel.

Existing stub wall and railings removed.

Paved area incorporated into Viaduct Gardens

New railings creating new perimeter to Viaduct Gardens

New raised section of seawall tapers down from 5.60 in corner to ground under viaduct.

New gulleys and chambers to increase highway drainage capacity at low point (arrangement tbc)

New setback wall at rear of gardens. Top of wall 5.30. Stone block masonry finish.

Control box for new underground pumping station and new chambers (arrangement tbc)

Arrangement TBC

Single leaf flood gate. Top of gate 5.30. Painted steel.

Single leaf flood gate. Top of gate 5.30. Painted steel.

Existing outfall and pipe onto beach to be removed

New surface water outfall on beach further out than existing and viaduct (exact levels and location tbc)

Existing seawall repaired and refaced with stone masonry cut from stones in existing seawall.

New raised section of seawall immediately behind but integral to repaired existing seawall. Top of wall 5.60. Stone block masonry finish.

Rock armour. Existing 'temporary' rock armour redistributed across front of seawall with additional smaller stones incorporated as required.

New mid-height step to tie in with existing at west end of wall. Stone block masonry finish (where visible above rock armour) with concrete top surface.

SCALE 1:200 (m)

Nodiadau / Notes

1. All dimensions are in millimetres unless noted otherwise.
2. All levels are in metres relative to ordnance datum Newlyn (mAOD) unless noted otherwise.
3. All coordinates are in metres relative to ordnance survey national grid.
4. Do not scale from this drawing. all dimensions must be checked / verified on site.

Legend

Land Ownership Boundary

Planning Application Boundary

Reference Drawings

285699-ARP-XX-DR-GEN-100
285699-ARP-XX-DR-GEN-110
285699-ARP-XX-DR-GEN-120
285699-ARP-XX-DR-GEN-150
285699-ARP-XX-DR-GEN-170

Hanes Fersiwn / Version History

Rev	Date	By	Chkd	Appd
P02	31.05.23	CF	JB	BM
WORK IN PROGRESS				
P01	07.03.23	CF	JB	BM
WORK IN PROGRESS				

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Cleient / Client

YGC

Llywodraeth Cymru
Welsh Government

Enw a Rhif y Prosiect Cyngor Gwynedd / Gynedd Council Project Name and Number

Cynllun arfordirol Gerddi Traphont

Viaduct Gardens Coastal Scheme

Teitl Lluniad / Drawing Title

Planning Application
Proposed Site Layout

Graddfa yn A1 / Scale at A1

1:200 @ A1

Rhan / Role

Civil Engineer

Addasrwydd / Suitability	Statws / Status
For Planning	S2
Rhif y Prosiect Arup / Arup Project Number	Adolygiad / Rev
285699-00	P02

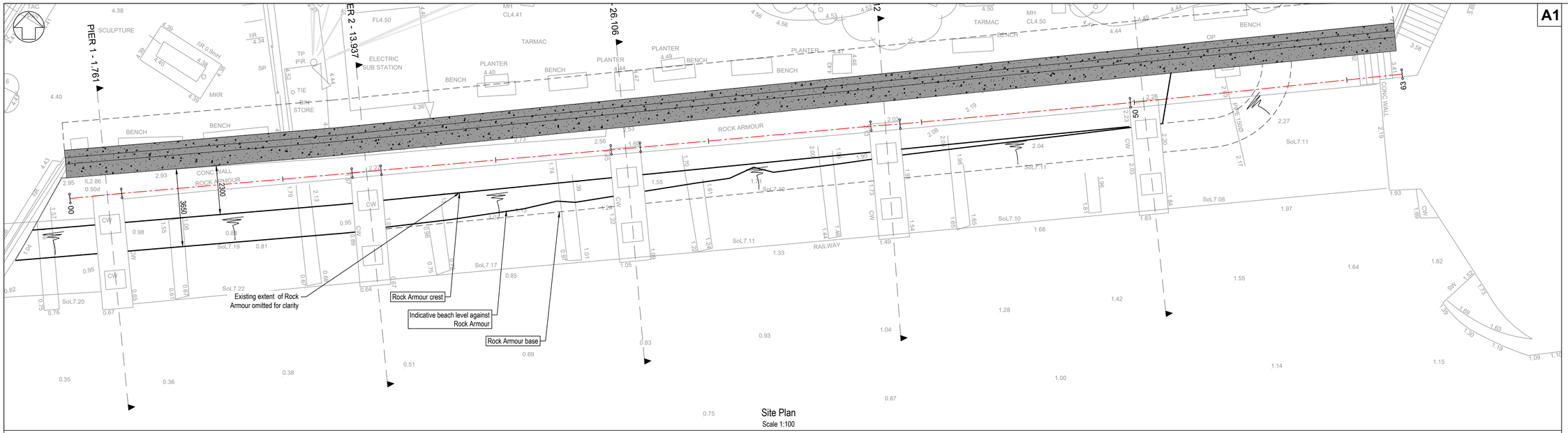
Rhif y Lluniad / Drawing Number

285699-ARP-XX-DR-GEN-150

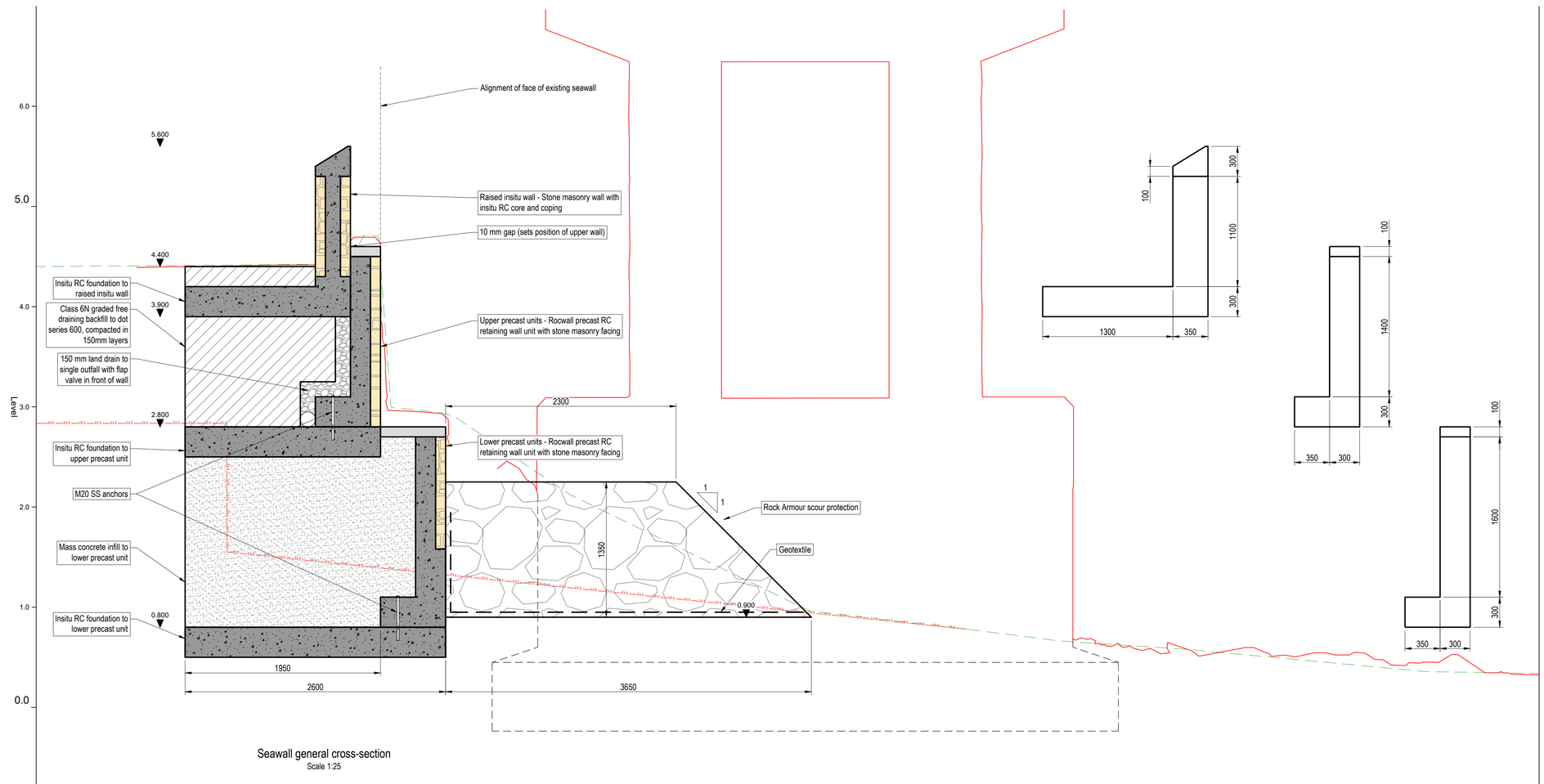
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Site Plan
Scale 1:100



Seawall general cross-section
Scale 1:25

DATUM (mAOD) -1.0

OFFSET	-5.00	-4.00	-3.00	-2.00	-1.00	0.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
EXISTING GROUND	4.40	4.41	4.42	4.42	2.95	2.34	1.80	1.31	0.93	0.81	0.69	0.61	0.53	0.44	0.36	0.34

PIER 1 - 1.761

1000 500 0 500 1000 1500 2000
SCALE 1:25 (mm)

5 4 3 2 1 0 2 4 6
SCALE 1:100 (m)

A1

Nodiadau / Notes

1. All dimensions are in millimetres unless noted otherwise.
2. All levels are in metres relative to ordnance datum Newlyn (mAOD) unless noted otherwise.
3. All coordinates are in metres relative to ordnance survey national grid.
4. Do not scale from this drawing. All dimensions must be checked / verified on site.
5. Rock Armour scour protection in front of new wall to re-use existing rocks, assumed 280t of 600-900mm (0.5-1.9t) material with Dn50=0.75m. Existing rocks to be placed on top layer and western end of frontage and imported rock armour of 0.3-1t grading is required to complete works. Layout assumes layer coefficient Kt=0.9. Existing bed levels to be reinstated post construction of scour protection.

Legend

- Existing surface derived from topo
- Existing surface derived from point cloud
- Existing information derived from historic drawings

Hanes Fersiwn / Version History

Rev	Date	By	Chkd	Appd
P01	31.05.23	CF	JB	BM
DRAFT FOR COMMENT				

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Enw a Rhif y Prosiect Cyngor Gwynedd / Gynedd Council Project Name and Number

Cynllun arfordirol Gerddi Traphont

Viaduct Gardens Coastal Scheme

Teitl Lluniad / Drawing Title

Proposed Seawall Details - Typical Section

Graddfa yn A1 / Scale at A1	
AS SHOWN @ A1	
Rhan / Role	
Civil Engineer	
Addasrwydd / Suitability	Statws / Status
For Information	S2
Rhif y Prosiect Arup / Arup Project Number	Adolygiad / Rev
285699-00	P01

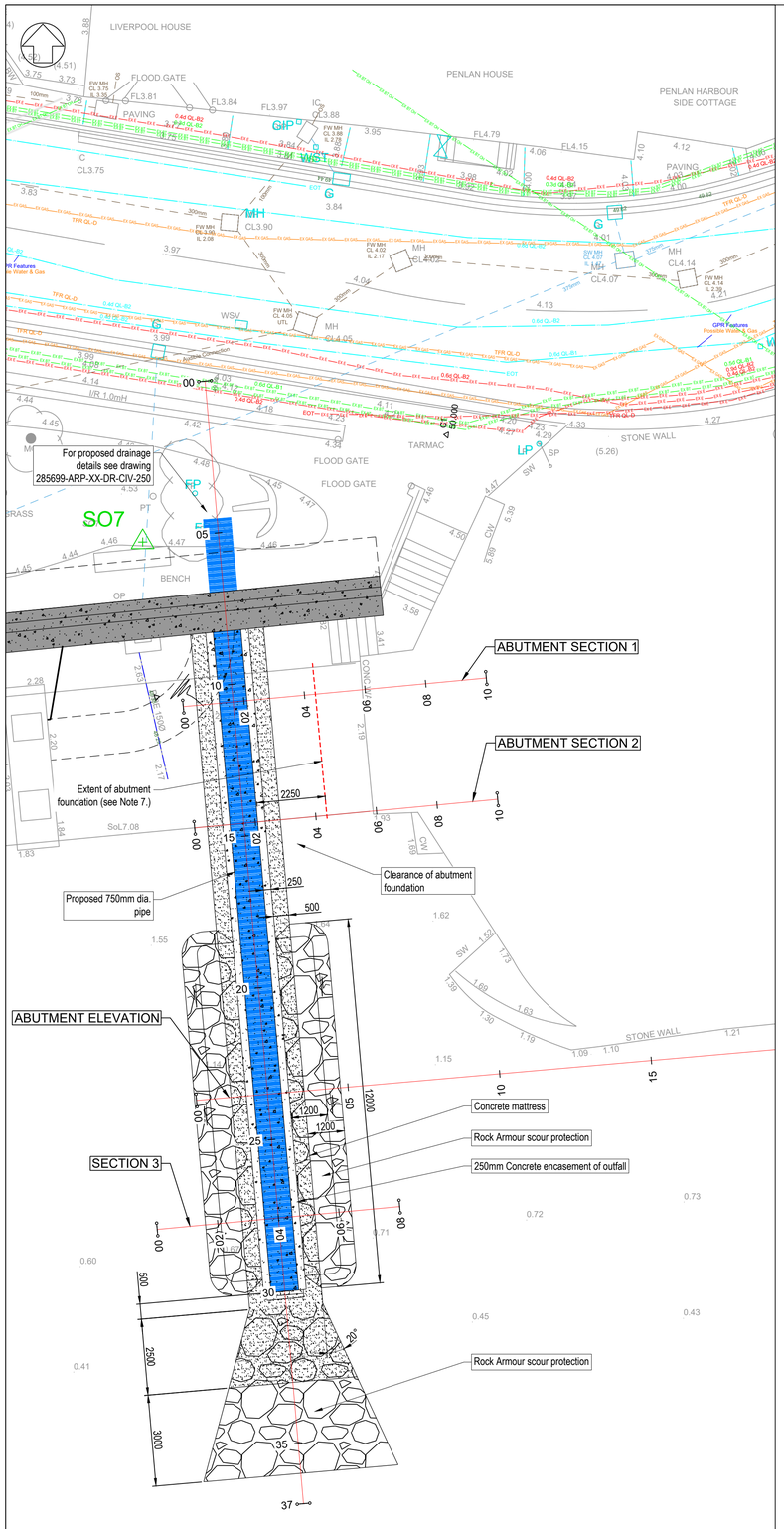
Rhif y Lluniad / Drawing Number

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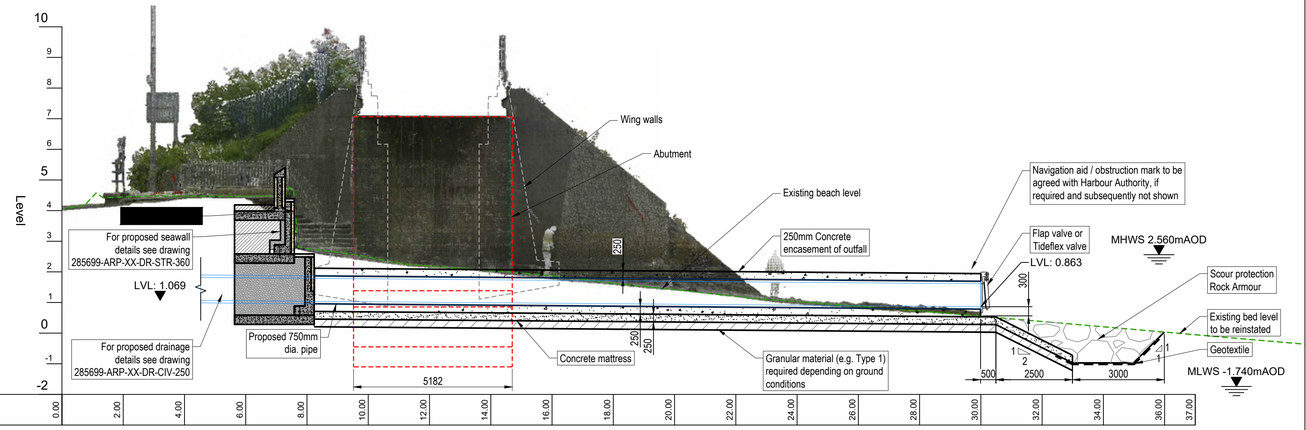
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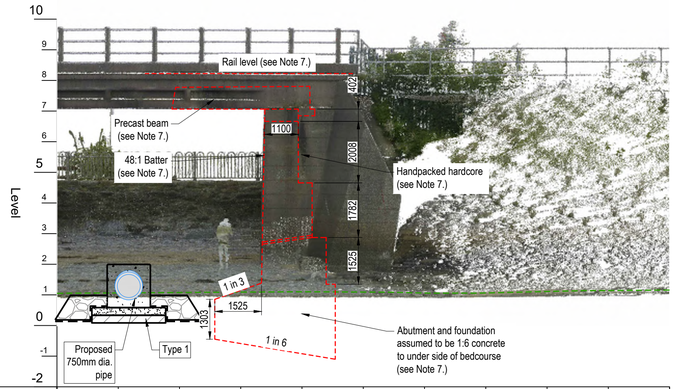
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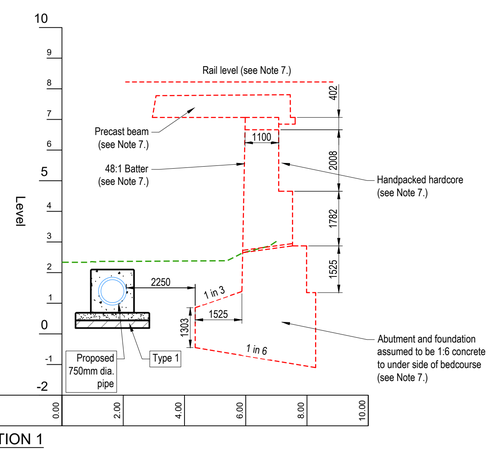
Site Plan
Scale 1:100



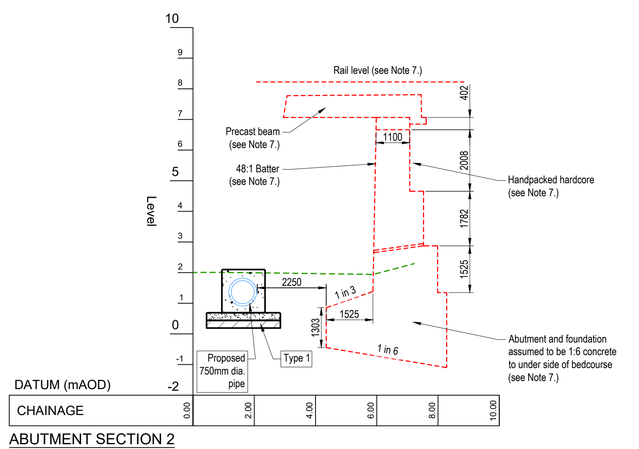
OUTFALL ALIGNMENT
SCALE: 1:100



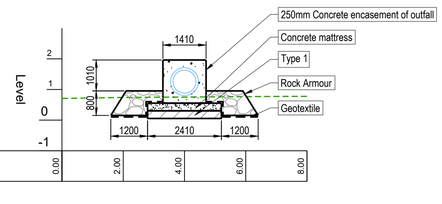
ABUTMENT ELEVATION
SCALE: 1:100



ABUTMENT SECTION 1
SCALE: 1:100



ABUTMENT SECTION 2
SCALE: 1:100



SECTION 3
SCALE: 1:100

SCALE 1:100 (m)

A1

Nodiadau / Notes

1. All dimensions are in millimetres unless noted otherwise.
2. All levels are in metres relative to ordnance datum Newlyn (mAOD) unless noted otherwise.
3. All coordinates are in metres relative to ordnance survey national grid.
4. Do not scale from this drawing. All dimensions must be checked / verified on site.
5. Refer to PN22427 Barmouth Viaduct Gardens Factual Report on Ground Investigation, Geotechnics (February 2023).
6. Outfall to extend on the foreshore until invert level is 300mm above bed level (minimum).
7. Abutment shown as derived from historical drawing of Barmouth Reconstruction of Old Chapel Viaduct Substructure.

Legend

- Information derived from historical drawings (see Note 7.)
- Existing beach level

Tide Levels

Datum	mAOD
HAT	3.26
MHWS	2.56
MHWN	1.26
MSL	0.26
MLWN	-0.54
MLWS	-1.74
LAT	-2.14

Hanes Fersiwn / Version History

Rev	Date	By	Chkd	Appd
P02	08.06.23	CF	DO	BM
DRAFT FOR COMMENT				
P01	31.05.23	CF	DO	BM
DRAFT FOR COMMENT				

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Enw a Rhif y Prosiect Cyngor Gwynedd / Gynedd Council Project Name and Number

Cynllun arfordirol Gerddi Traphont

Viaduct Gardens Coastal Scheme

Teitl Lluniad / Drawing Title

Proposed Drainage Sections - New Outfall

Graddfa yn A1 / Scale at A1
AS SHOWN @ A1

Rhan / Role
Civil Engineer

Addasrwydd / Suitability	Statws / Status
For Information	S2
Rhif y Prosiect Arup / Arup Project Number	Adolygiad / Rev
285699-00	P02

Rhif y Lluniad / Drawing Number

285699-ARP-XX-DR-CIV-290

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Appendix C

Preliminary Ecological Appraisal (285699-ARP-XX-RP-ENV-003)

ARUP

Ymgynghoriaeth Gwynedd Consultancy (YGC)

Barmouth Viaduct Gardens

Preliminary Ecological Appraisal

Reference: 285699-ARP-RP-ENV-003

P01 | 16 May 2022



This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 285699-00

Ove Arup & Partners Limited
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Contents

1.	**Introduction**	**1**
1.1	Project background	1
1.2	The Site	1
1.3	Scope of this report	2
1.4	Legislative and policy context	3
1.5	Local policy	4
2.	**Methodology**	**5**
2.1	Zone of Influence	5
2.2	Desk study	5
2.3	Extended Phase 1 Habitat Survey	6
2.4	General survey limitations and specific constraints	7
3.	**Results and interpretations**	**8**
3.1	Designated sites	8
3.2	Habitats	16
3.3	Protected and notable species	18
4.	**Recommendations**	**23**
4.1	Designated sites	23
4.2	Habitats	24
4.3	Protected and notable species	25
4.4	Enhancement measures	28
5.	**Summary and Conclusions**	**30**

Tables

Table 2.1: Zone of influence used for this assessment 5

Table 3.1: Statutory designated sites 8

Table 3.2: Non-statutory designated sites 14

Figures

Figure 1.1: Site location plan. Study area outlined in red with key features labelled. 2

Figure 3.1: Location of statutory designated sites within 10km of site boundary 13

Appendices

Appendix A **A-31**

Legislation and Policy A-31

A.1	Legislative Context	A-31
A.2	Designated Sites	A-31
A.3	Protected and Notable Species	A-32
A.3.1	European Protected Species	A-32
A.3.2	UK Protected Species	A-33

A.3.3 Other Legislation Relating to Species A-33
A.3.4 Invasive Non-Native Species A-34
A.4 Hedgerow Regulations 1997 A-34
A.5 The well-being of Future Generations Act 2015 A-34
A.6 Planning Policy A-35
A.6.1 Planning Policy Wales (PPW) A-35

Appendix B **B-37**

Anglesey and Gwynedd Joint LDP – Local Planning Policies B-37
B.1 Conserving and enhancing the natural environment B-38

Appendix C **C-40**

Extended Phase 1 Habitat Survey Results C-40
C.1 Extended Phase 1 Habitat Survey Results C-41

1. Introduction

1.1 Project background

Ove Arup and Partners Limited (Arup) has been appointed by Ymgynghoriaeth Gwynedd Consultancy (YGC) of Cygnor Gwynedd Council (CGC) to undertake a Preliminary Ecological Appraisal (PEA) for the detailed design of the Viaduct Gardens Flood Alleviation Scheme (FAS), hereafter referred to as the 'Scheme'.

Barmouth (Abermaw) in Gwynedd, Wales is located on the northern shore on the mouth of the Mawddach Estuary. Barmouth seafront is prone to flooding due to both overtopping of the sea wall and surface run-off from the bluff behind the town (Dinas Oleu). A Project Appraisal Report (PAR) was originally undertaken in 2004. This was updated in 2018 and formed the basis of an Outline Business Case (OBC), approved June 2021.

The OBC presented five objectives of the Scheme:

1. Reduce the risk of coastal flooding to properties at the Viaduct Gardens frontage, Barmouth;
2. Maintain existing landscape character of the area whilst enhancing sea defences;
3. Reduce flood risk to the A496 county road;
4. Enhance sea defences without causing damage/ harm to the natural environment; and
5. Maintain the Cambrian coast railway.

Nine options were presented within the OBC for coastal flood risk management along the seafront, of which Option 8 was preferred. Option 8 works include:

- a raised sea wall with new access gates;
- repairs to the existing sea wall;
- a new 450mm culvert in Church Street with gullies; and
- a new pumping station and outfall to upgrade existing network with additional gullies.

1.2 The Site

A plan of the site location including the study area is provided in Figure 1. The preferred option (Option 8) covers two distinct stretches of sea front at Barmouth. For the purposes of this Project, these are referred to as Frontage 1 and Frontage 2 as shown in Figure 1. Since the OBC was approved, the proposed approach along Frontage 2 has been reviewed. Concerns over the feasibility and viability of constructing a permanent set-back flood wall parapet have led to an emerging option of property level protection approach to minimise changes to the public infrastructure of the sea front. While YGC explore this option, Arup's commission in Frontage 2 is limited to including it within project investigations. The main focus of the study and design is therefore Frontage 1 and the area immediately behind Viaduct Gardens.

The Viaduct Gardens area is located near St David's Church at the south end of the town and consists of a pedestrianised public space which is bounded landward by the A496 (Porkington Terrace) and Church Street. On the seaward side is a slightly raised parapet seawall which runs along the harbour area and is just behind the railway viaduct near where it makes landfall. In addition to the railway line and roads there is significant infrastructure at this location in the form of a Welsh Water (DCWW) combined pump and combined sewer overflow (CSO), and an electricity substation.

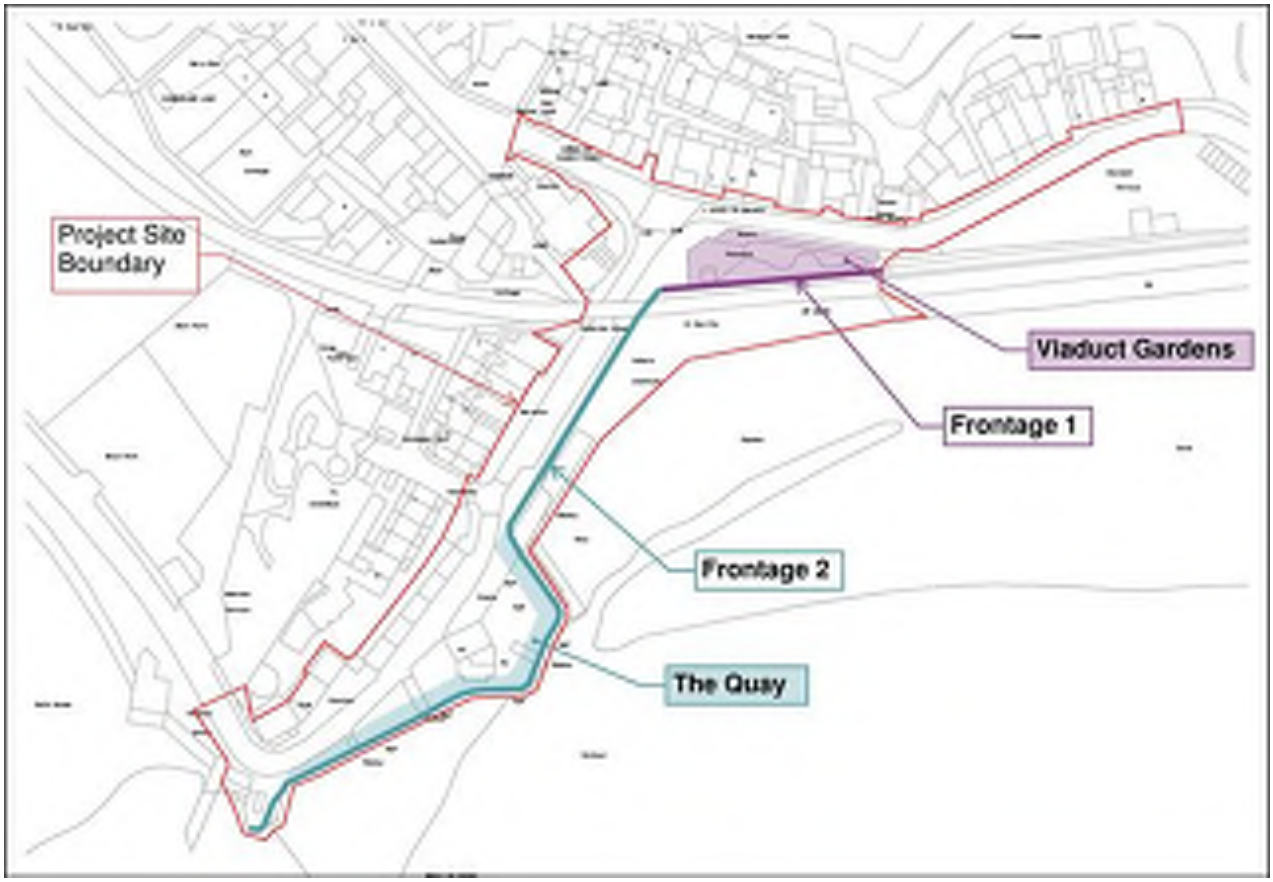


Figure 1.1: Site location plan. Study area outlined in red with key features labelled.

1.3 Scope of this report

The purpose of this report is to quantify and evaluate the potential effects of the development on habitats, species and ecosystems. This involves an assessment of the habitats present within the footprint of the works and the potential for the site to support any legally protected or notable species. Following this assessment, the report will then detail the need for any further surveys and make recommendations for mitigation and enhancement measures to be incorporated into the project where appropriate. This PEA has been written in accordance with the Guidelines for Preliminary Ecological Appraisal 2nd Edition[1].

The objectives of this PEA are:

1. To establish baseline ecological conditions in the site and within the immediate vicinity, including its potential to support important habitats and notable / protected / invasive species;
2. To identify key ecological constraints to the proposed works;
3. To inform project design to allow significant ecological effects to be avoided or minimised wherever possible; and
4. To recommend further ecological surveys required to inform an updated ecological assessment as appropriate.

[1] Chartered Institute of Ecology and Environmental Management (CIEEM) (2017). Guidelines for Preliminary Ecological Appraisal. 2nd Edition. [Online] available at: https://cieem.net/resource/guidance-on-preliminary-ecological-appraisal-gpea/ (Accessed: 22/03/22).

1.4 Legislative and policy context

A list and brief overview of the key legislation that has been taken into account for the purpose of this assessment is detailed below. A full list of relevant legislation and policy is provided in Appendix A.

- The Conservation of Habitats and Species Regulations 2017 - as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019;
- Wildlife and Countryside Act 1981 (as amended) (WCA);
- The Environment (Wales) Act 2016;
- Planning Policy Wales 2021;
- National Park and Access to the Countryside Act 1949 (as amended);
- Countryside and Rights of Way Act 2000 (CRoW);
- The Hedgerow Regulations 1997;
- Birds of Conservation Concern 5 2021;
- Protection of Badgers Act 1992;
- Wild Mammals (Protection) Act 1996; and
- The Invasive Alien Species (Enforcement and Permitting) Order 2019.

The Conservation of Habitats and Species Regulations (CHSR) 2017 (as amended) sets out protection for habitats and species listed within its annexes. This includes legislation covering European Protected Species (EPS) and the National Site Network[2] (NSN).

The WCA protects a range of wildlife, the most relevant to this report including: the protection of wild birds and their eggs whilst nests are in use, making it an offence to injure or kill a number of species listed on Schedule 5, protecting wild plants listed under Schedule 8, and making it unlawful to plant or otherwise cause to spread in the wild any plant which is listed under Part II of Schedule 9. Together the CHSR and WCA form the precedent for species and habitat protection in England and Wales, which are further supplemented by legislation noted above. This legislation must be considered as part of any development proposals regardless of whether planning permission is required.

At the national level, the Environment (Wales) Act 2016 requires public authorities to seek to maintain and enhance biodiversity to promote the resilience of ecosystems when undertaking their functions. This includes consideration of species and habitat listed under Section 7 of this act as those of 'principal importance' to conserving and enhancement biodiversity in Wales. Additionally, Chapter 6 of Planning Policy Wales[3] (which relates to conserving and enhancing the natural environment) requires development plan strategies, policies and development proposals to secure the conservation and enhancement of biodiversity, including the conservation of wildlife and habitats, safeguarding the ecological networks and components which underpin them (e.g. water and soil) and improve ecosystem resilience by improving diversity, condition, extent and connectivity of ecological networks.

Further consideration to the Sustainable Management of Natural Resources (SMNR) as required under the Environment (Wales) Act has been detailed under the Natural Resources Policy[4] (Welsh Government, 2017). This includes:

[2] Formerly known as 'Natura 2000 sites' or 'European sites'.

[3] Welsh Government Planning Policy Wales Edition 11. February 2021. Planning Policy Wales - Edition 11 (gov.wales)

[4] https://gov.wales/sites/default/files/publications/2019-06/natural-resources-policy.pdf

- Using resources sustainably to support move towards a more circular economy and accelerating green growth through increasing renewable energy and resource efficiency;
- Improving ecosystem health and resilience to tackle climate change and the decline in biological diversity through the delivery of nature-based solutions for mitigation and adaption; and
- Taking a place-based approach to deliver better results at a local level by enabling collaboration at the right scale (e.g. site, regional catchment, landscape or ecosystem) and at the right locations to tackle issues and maximise benefits. Area statements (as required under Section 11 of the Environment (Wales) Act) will play a key role in identifying these local opportunities and constraints.

1.5 Local policy

Seven local planning policies are set out within the Joint Anglesey and Gwynedd Local Development Plan (LDP) (2011–2025)[5] (see Appendix B). The current LDP encourages 'Conserving and Enhancing the Natural Environment' by recognising the statutory protection afforded to internationally and nationally designated landscapes, sites/ habitats and individual species. This LDP also acknowledges the key role of the planning system in protecting and enhancing the natural environment.

The current LDP is due to be updated with a Replacement Joint LDP. Local policy is subject to change upon publication of the latest LDP.

Area statements have been produced detailing the key challenges that are faced in different localities across Wales. The North West Wales Area Statement[6] covers an extensive landscape of settlements, lowland and coastal areas, as well as upland areas (including Snowdonia National Park). The key challenge stakeholders identified in North West Wales is the climate and environment emergency with impacts of rising sea levels highlighted as a threat to vulnerable communities along the coast and severe droughts and increased frequency of wild fires causing additional stress of native wildlife and natural habitats. Further key themes identified relating to biodiversity included reconnecting people with nature, encouraging a sustainable economy, supporting sustainable land management and opportunities for resilient ecosystems.

As part of the Area Statements opportunities for biodiversity relating to the key challenges identified have included:

- Using nature-based solutions to tackle climate change, such as improving management of forests and peatlands to increase greater storage of carbon and water;
- Tapping into natural flood risk management to reduce the risk of flooding and coastal erosion to areas across the North West; and
- To support flood defences there is an opportunity to build softer approaches that encourage natural flood management techniques, including: restoring degraded peatland, tree planting in the uplands and reinstating hedgerows. This will support biodiversity conservation and habitat connectivity.

[5] https://www.gwynedd.llyw.cymru/en/Council/Documents---Council/Strategies-and-policies/Environment-and-planning/Planning-policy/Anglesey-and-Gwynedd-Joint-Local-Development-Plan-Written-Statement.pdf [Last accessed: 05/04/2022]

[6] https://naturalresources.wales/about-us/area-statements/north-west-wales-area-statement/?lang=en [online] [Last Accessed: 05/04/2022]

2. Methodology

2.1 Zone of Influence

The current guidance on ecological assessments (Chartered Institute of Ecology and Environmental Management (CIEEM)[7] recommends that all ecological features that occur within a 'Zone of Influence' (ZoI) for a proposed development are investigated.

The ZoI includes:

- Areas directly within the land take for the proposed development and access;
- Areas which will be temporarily affected during construction;
- Areas likely to be impacted by hydrological disruption; and
- Areas where there is a risk of wider disbenefits including, but not limited to, any increase in air, water, or noise pollution; or visual or vibrational disturbance during construction and/or operation.

The ZoI is variable depending on the nature of the construction activities and the ecological receptors affected. For this assessment the following zones have been defined (Table 1).

Table 2.1: Zone of influence used for this assessment

Ecological features	Zone of Influence
Statutory designated sites	10km around site boundary
Non-statutory designated sites	2km buffer around site boundary
Relevant species records (including protected and invasive species)	2km from around boundary
Appraisal of habitats and potential for protected species	50m buffer around site boundary

2.2 Desk study

A desk study has been undertaken to determine the presence of designated sites and protected or notable species within the ZoI of the site, as determined in Section 2.1. Species records obtained from the local data centre (Cofnod) have been curtailed to the last ten years to ensure validity. The following sources have been consulted as part of the desk study:

- Multi-Agency Geographical Information for the Countryside (MAGIC)[8];
- Cofnod - the Local Environmental Records Centre for North Wales[9]
- Joint Nature Conservation Committee (JNCC)[10];

[7] Chartered Institute of Ecology and Environmental Management (CIEEM), 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine.

[8] https://magic.defra.gov.uk/MagicMap.aspx

[9] https://www.cofnod.org.uk/Home

[10] https://jncc.gov.uk/

- Natural Resources Wales Wildlife and Biodiversity Guidance and Advice[11];
- Lle: A Geo-Portal for Wales[12]
- OS Open Maps (https://www.openstreetmap.org);

2.3 Extended Phase 1 Habitat Survey

The site was inspected to establish the presence, or potential presence, of protected or notable species or habitats (or invasive species) which would be affected by the proposed works. Habitats were mapped on the Extended Phase 1 Habitat Survey Plan with reference to JNCC's Handbook for Phase 1 Habitat Survey[13] within and up to 50m from the Site boundary. Target Notes (TNs) were used to highlight any features of interest, such as those that provide suitable habitat for protected species, or habitats that were too small to appear at the drawing's resolution.

Relevant species included all those protected by European or UK law, and notable species including those identified as being of principal importance in Wales, in response to Section 7 of the Environment (Wales) Act 2016 (Appendix A), as follows:

- Rapid visual inspection to identify structures and trees (from the ground only) that will require further survey to assess their suitability to support breeding, resting and hibernating bats, based on those outlined in the Bat Conservation Trust's Bat Surveys: Good Practice Guidelines Good Practice Guidelines[14];
- Outline the potential for habitats to support badger (*Meles meles*) and carry out preliminary searches for signs of badger activity including setts, tracks, foraging holes and latrines[15];
- Outline the potential for habitats and watercourses to support otter (*Lutra lutra*) and carry out preliminary searches for signs of otter[16];
- Outline the potential for habitats to support nesting birds (including any old nests);
- Outline the potential for habitats to support common species of reptiles; adder, (*Vipera berus*), grass snake (*Natrix helvetica*), slow worm (*Anguis fragilis*) and common lizard (*Zootoca vivipara*)[17];
- Outline the potential for habitats to support assemblages of notable invertebrates; and
- Searching for evidence of the presence of invasive plants listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), such as New Zealand pigmyweed (*Crassula Helmsii*) or Japanese knotweed (*Fallopia japonica*) and The Invasive Alien Species (Enforcement and Permitting) Order 2019, which are subject to strict legal control, such as Himalayan balsam (*Impatiens glandulifera*).

An Extended Phase 1 Habitat Survey was undertaken by Arup Ecologist Hayley Glanville between 9th and 10th February 2022. Alongside this survey, a preliminary inspection of the intertidal habitats was carried out by Arup Graduate Consultant Bethan Follis.

[11] https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity

[12] http://lle.gov.wales/home

[13] JNCC (2016). Handbook for Phase 1 habitat Survey: technique for environmental audit.

[14] Collins, J. (2016). Bat Surveys: Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed.). The Bat Conservation Trust, London.

[15] Harris, S., Cresswell, P. and Jefferies, D., 1989. Surveying Badgers. Mammal Society.

[16] Chanin, P. (2003). Monitoring the Otter, Lutra lutra. Conserving Natura 2000 Rivers Monitoring Series No. 10., English Nature, Peterborough.

[17] Gent, T. & Gibson, S. (2003). Herpetofauna Workers Manual. Joint Nature Conservation Committee, Peterborough.

2.4 General survey limitations and specific constraints

The findings presented in this report represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys can be limited by factors affecting the presence of plants and animals, such as the time of year, migration patterns and behaviour. This survey was undertaken in February which is beyond the optimal period for vegetation surveys (typically April to September) and as such, some species and indicators may therefore have not been identified.

Whilst not a full protected species or botanical survey, an Extended Phase 1 Habitat Survey allows an experienced ecologist to obtain a sufficient understanding of the ecology of a site in order to either confirm the conservation importance of the site and assess the potential for impacts on habitats and species likely to represent a material consideration in planning terms, or to ascertain that further surveys will be required before such confirmation can be made.

The survey period was timed to be carried out during the level of low tide, however during this survey period some substrate within the southern aspect of the survey area was still situated below the tide. This restricted surveyor access to fully survey the coast, including the seawall for potential marine invertebrate species and potential bat roosting features (PRF). A Phase 1 Habitat survey of coastal substrate (intertidal habitat) was still able to be carried out due to the high visibility and shallow level of the sea water. Surveyors were able to continue this survey by viewing the habitat from above, standing atop the seawall behind a barrier.

The absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future. The absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future. Moreover, information obtained during the desk study is dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for a habitat or species does not necessarily mean the absence of habitats or species on the site or surrounding.

In spite of the limitations outlined above, this report is considered to deliver an adequate baseline appraisal of the ecological features for the management scheme. The limitations are not considered critical enough to skew the outcomes and further recommendations described in this report.

3. Results and interpretations

3.1 Designated sites

3.1.1 Statutory designated sites

A total of nine internationally designated sites were identified within 10.0km of the proposed works, including Special Areas of Conservation (SAC) and Special Protection Areas (SPA). Two of these sites, Lleyn Peninsula and the Sarnau SAC and Meirionnydd Oakwoods and Bat Sites SAC, are situated within 2.0km of the proposed works.

A total of seventeen Sites of Special Scientific Interest (SSSIs) were identified within 10.0km of the proposed works. Two of these sites, Mawddach Estuary SSSI and Barmouth Hillside SSSI were identified within 2.0km of the site. Full details of statutory sites, including details of the site's features can be found in Table 2 and viewed in Figure 2.1.

Table 3.1: Statutory designated sites

Designated site	Site features	Distance and direction from the sites
Internationally designated sites		
Lleyn Peninsula and the Sarnau SAC	This site is primarily designated for: • Sandbanks which are slightly covered by sea water all the time; • Estuaries, including the Glaslyn/Dwyryd, Mawddach and Dyfi estuaries. The intertidal sandflats support communities of burrowing invertebrates, including dense populations of polychaete worms (such as *Levinsenis gracilis*), crustaceans (such as *Eudorella truncata*), bivalve molluscs (such as *Mysella bidentata*) and gastropod molluscs (such as *Otina ovata*); • Saltmarsh fringing the shores of the estuaries, and the saltmarsh creeks and pools, are important habitat features for juvenile fish; • Coastal lagoon Morfa Gwyllt is a small percolation lagoon that consists of a depression in a shingle bar across the mouth of the Afon Dysynni in mid Wales. This is the only example of a percolation lagoon in Wales. Three lagoonal specialists have been found at this site: an amphipod (*Sphaeroma hookeri*), a bryozoan (*Conopeum seurati*) and an alga (*Chaetomorpha linum*); • Large shallow inlets and bays, such as the seabed of Tremadog Bay on the south side of the Lleyn Peninsula, consisting of a mosaic of different sediment types. Algal species (*Naccaria wiggii* and *Scinaia* spp.) are present. Burrowing animals, including bivalves, crabs, brittlestars, urchins and worms, dominate the muddier sediments. Beds of eelgrass (*Zostera angustifolia*) and muddy gravel shores. Gravelly beach supports a nationally rare amphipod (*Pectenogammarus planicrurus*). Several unusual species include bearded red seaweed (*Anotrichium barbatum*) and a mantis shrimp (*Rissoides desmaresti*); and • Reefs encompassing a varied range of reef habitats, including submerged and intertidal glacial moraines. There are distinctive communities on bedrock and boulders, ranging from sites exposed to very strong	On site.

Designated site	Site features	Distance and direction from the sites
	wave action and/or tidal streams to sites sheltered from strong water movement. Algal communities are dominant over much of the reefs, with growths of foliose red and brown algae forming very dense beds in many places, in the absence of shading from kelp. Two brown algae species (*Chorda filum* and *Laminaria saccharina*) and red algae flourish on or near the reef crest, the number of algae species on pebbles increases with depth. In certain areas there are extensive forests of sea-oak (*Halidrys siliquosa*). Rich animal-dominated biotopes are found in the deeper parts of the reefs, including crustaceans, cnidarians, sponges, hydroids and encrusting bryozoans. • Glasswort (*Salicornia* sp.) and other annuals colonising mud and sand; • Otter, grey seals (*Halichoerus grypus*) and bottlenose dolphins (*Tursiops truncates*) are present.	
Meirionnydd Oakwoods and Bat Sites SAC	The site is primarily designated for its old sessile oak (*Quercus petraea*) woods with genus Ilex and genus Blechnum in the British Isles, alluvial forests with alder (*Alnus glutinosa*) and ash (*Fraxinus excelsior*) (*Alno-Padion, Alnion incanae, Salicion albae*), and lesser horseshoe (*Rhinolophus hipposideros*) bat populations which includes the majority of known maternity roosts in Meirionnydd and several hibernacula.	20m north-east at closest approach.
Northern Cardigan Bay SPA	Over winter: Red-throated diver (*Gavia stellata*), 1,186 individuals representing 7% of the wintering population in Great Britain (2001/02 – 2003/04)	3.5km west, hydrologically connected via Mawddach Estuary and west towards Barmouth Bay.
Cadair Idris SAC	Oligotrophic to mesotrophic standing waters, with clear-water lakes with aquatic vegetation and poor to moderate nutrient levels. Contains siliceous scree with parsley fern (*Cryptogramma crispa*) and wavy hair grass (*Deschampsia flexuosa*) NVC community present. Calcareous and siliceous rock slopes with chasmophytic vegetation are also important for this site, including *Cryptogramma crispa – Deschampsia flexuosa* NVC community present in some places.	4.3km south-east at closest approach.
Morfa Harlech a Morfa Dyffryn SAC	Designated for its presence of important species, including dunes with creeping willow (dunes with *Salix repens* ssp. *Argentea* (*Salicion arenariae*)), embryonic shifting dunes, humid dune slacks, petalwort (*Petalophyllum ralfsii*) and shifting dunes along the shoreline with European marram grass (*Ammophila arenaria*) – known as 'white dunes'.	7.1km north-west at the closest approach, connected hydrologically along the west coast.
Cadair Idris NNR	The rocky peaks of Cadair Idris were formed by volcanic processes and later sculpted over many Ice Ages by glaciers as they thawed and shattered the rocks. The geology supports a wealth of wildlife and special plants.	8.1km south-east at closest approach.
Morfa Dyffryn NNR	Morfa Dyffryn National Nature Reserve is one of the most important dune systems in Wales because of its bare sand and wildlife habitats. Dunes like these with bare sand areas are becoming increasingly rare.	8.6km north-west at closest approach, connected hydrologically along the west coast.

Designated site	Site features	Distance and direction from the sites
Craig yr Aderyn (Bird's Rock) SPA	Chough (*Pyrrhocorax pyrrhocorax)* present during the breeding season, 6 pairs representing 1.8% of the breeding population of Great Britain (1999). A total of 55 individuals of chough present over winter, representing 8% of the wintering population of Great Britain (1996).	8.6km south-east at closest approach.
Rhinog SAC	Designated for its dry heaths and old sessile oak woods, with genus Ilex and genus Blechnum.	9.5km north.
Nationally designated sites		
Mawddach Estuary SSSI	Designated for its biological features, including the estuary itself, a large shallow estuary which drains south-west into Cardigan Bay, and a series of adjacent habitats. The overall management objective for the SSSI is to retain the habitat- and species-related interest of the area. Aber Mawddach supports other notable invertebrates and is of local importance for its breeding birds and wintering wildfowl. Breeding birds include skylark (*Alauda arvensis*), barn owl (*Tyto alba*), song thrush (*Turdus philomelos*), reed bunting (*Emberiza schoeniclus*), grasshopper warbler(*Locustella naevia*), reed warbler (*Acrocephalus scirpaceus*), kingfisher (*Alcedo atthis*), water rail (*Rallus aquaticus*) and goosander (*Mergus merganser*). Chough feed here, and breed and roost nearby. Wintering wildfowl and waders include wigeon, teal, oystercatcher, curlew and shelduck. The Mawddach estuary used to be locally important for breeding lapwings up until the early 1990s.	On site.
Barmouth Hillside SSSI	Situated on the slopes immediately north of Barmouth town, containing an area of rare wind-pruned oak woodland. This site also contains disused quarries, mine workings and spoil tips as a legacy of previous slate mining activity. Species in ground flora include bluebell (*Hyacinthoides non-scripta*) and wood sage (*Teucrium scorodonia*). Localised nutrient enrichment due to the presence of manganese shales results in more lush flora including Ramsons (*Allium ursinum*) and Cuckoo-pint (*Arum maculatum*) with ash often abundant. One to two pairs of chough breed here and feeding chough are regularly seen in small numbers throughout the year. A flock of 30 birds has been recorded recently and the site used to support a communal roost.	20m north-east at closest approach.
Ty Bach Ystlumod SSSI	Tŷ Bach Ystlumod is of special interest as a breeding roost of lesser horseshoe bats. The bats use Tŷ Bach Ystlumod during the summer months to raise their young. The bats use walls extending from the roost as flight lines to access the adjacent mature broadleaved woodland, which provides extensive feeding habitat.	2.5km south-east at the closest approach.
Arthog Hall Woods SSSI	A biological site selected as an example of a bryophyte-rich woodland with several rare and uncommon species. Sessile oak and downy birch (*Betula pubescens*) are the main canopy tree species with smaller amounts of ash, beech (*Fagus sylvatica*) and sycamore (*Acer pseudoplatanus*). Rare and uncommon bryophytes are present (*Jamesoniella autumnalis*, *Adelanthus*	2.9km south-east at closest approach. 4.4km connected hydrologically, however the Afon Arthog is upstream of the Mawddach Estuary and is

Designated site	Site features	Distance and direction from the sites
	decipiens, *Lepidozia cupressina*, *Fissidens celticus* and *Riccurdia palmata*).	not at risk of hydrological contamination.
Glannau Tonfanau i Friog SSSI	Geological and marine biological features, including its structural geological and mineralogical features which provide important evidence regarding the age of the Dolgellau Gold-Belt. This coast is also of special interest for its biogenic reefs, specialised rockpools and its extensive, natural, mixed substrate shore. There are unique reef features providing habitat for marine life. Coast here is known for extensive natural mixed substrata shore with honeycomb worm (*Sabellaria alveolata*) biogenic reefs and diverse coralline rockpools.	3.5km south hydrologically connected along Barmouth Bay.
Cregennen a Pared y Cefn Hir SSSI	Nationally important geological site providing exposed sections through the lower part of the Aran Volcanic Group. Site enables observing the relationships between rocks of mixed origin and for dating the volcanic episodes which interrupted normal marine sedimentation. The site is a key teaching, educational and research locality which is complementary to the classic volcanic terrain of nearby Cadair Idris.	3.9km east at the closest approach.
Cadair Idris SSSI	Rocky peaks formed by volcanic processes and later sculpted over many Ice Ages by glaciers as they thawed and shattered the rocks. The geology supports a wealth of wildlife and special plants.	4.3km south-east at closest approach.
Coedydd Abergwynant SSSI	Situated within Snowdonia National Park. Large oak woodland along the often steep-sided ravine of the Afon Gwynant. Dominated by sessile oak, also areas of mixed deciduous woodland with ash and wych elm (*Ulnus glabra*), and locally rare shrub spindle (*Euonymus europaeus*) reflects the underlying, less-acidic Ordovician volcanic rocks amongst the more common, acidic sedimentary rocks. Important site for ferns and bryophytes, also lichen flora. Several species of true flies Diptera have been recorded which are of restricted local or national distribution (including the rare *Dicranota gracilipes*).	5.9m east at closest approach. Connected hydrologically, however the Afon Gwynant is upstream of the Mawddach Estuary and therefore is not at risk of hydrological contamination.
Coed Cors y Gedol SSSI	One of the best examples of a woodland type for which West Wales is an important centre of distribution. It has a diversity of young, regenerating sessile oak and birch, smaller amounts of ash and goat willow (*Salix caprea*), and enhanced structural diversity with large amounts of hazel (*Corylus avellana*) and mature woodland to the south and south of the central area. There is a diversity of ground flora, fern and bryophyte. Grasses with rare bryophytes are present.	6.6km north-west at closest approach. Connected hydrologically, however the Afon Ysgethin is situated upstream , therefore is not at risk of hydrological contamination.
Morfa Dyffryn SSSI	Sand dunes, the seashore, saltmarsh and grassland. The site it also notified for its nationally rare and scarce higher plants, mosses and liverworts, nationally rare and scarce invertebrates, a population of great crested newts and honeycomb worm reefs.	6.9km north-west at closest approach.
Llyn Gwernan SSSI	An important palynological site, notable for an unusual thickness of Devensian Late-glacial organic deposits. These deposits preserve a detailed pollen record which, together with radiocarbon dates, has allowed far greater resolution of Late-glacial environmental change in Wales than at other sites.	8.4km east at the closest approach.

Designated site	Site features	Distance and direction from the sites
Craig yr Aderyn (Bird's Rock) SSSI	An important breeding location for chough and cormorant (*Phalacrocorax carbo*), a roosting site for chough throughout the year. Crags support over 1% of the British population of breeding chough, with five or more pairs nesting in holes and crevices. Non-breeder chough in the summer, high numbers outside the breeding season. Represent between 4-6% of the British wintering population. Unimproved acid grassland to north and east forms a large-scale mosaic with bracken (*Pteridium aquilinum*). The maintenance of a short sward of this grassland is one of the major factors influencing the number of breeding and roosting birds. Acidic, dry heathland occurs in the south-eastern part of the site. A small area of base-enriched marshy grassland above Gesail adds to the plant diversity.	8.6km south-east at closest approach.
Llwyn-iarth SSSI	Species-rich neutral grassland and large population of wood bitter-vetch (*Vicia orobus*). Extensive areas of flush and fen, and mixture of habitats which includes wet heath, marshy and acid grassland. It is also note for its geology.	8.6km east at the closest approach.
Penmaenuchaf Hall SSSI	A breeding roost of the lesser horseshoe bat. Used during the summer months by bats in order to raise their young. Lesser horseshoes return annually to the same site. Since 1994, the site has been used by over 100 bats annually. The site also supports a breeding roost of brown long-eared bats (*Plecotus auritus*). Natterer's bats (*Myotis nattereri*), common pipistrelles (*Pipistrellus pipistrellus*) and whiskered/Brant's bats (*Myotis mystacinus/brandtii*) have also been recorded at the site.	8.6km east at the closest approach.
Caeau Bwlch SSSI	The site supports one or more populations of hornet robberfly (*Asilus crabroniformis*), a rare species of fly which was first recorded here in 1992. This is one of the most important sites for the species in Wales and is currently one of only two known sites in north-west Wales.	9.4km north-west at closest approach.
Foel Ispri SSSI	One of numerous mines in the vicinity which lie within the Dolgellau Gold Belt. Of special scientific interest for the study of in situ mineralisation and associated wall-rock alteration as well as facilitating investigations into the mechanism of lode emplacement in various types of rock.	9.4km north-east at the closest approach.
Rhinog SSSI	Composed of hard, acidic Cambrian grits of the Harlech Dome, Rhinog has a rugged topography with block-littered slopes, numerous cliffs and rock outcrops. Heather (*Calluna vulgaris*) dominates large areas. Bryophyte carpets occur underneath and northern species (including *Ptilium cristacastrensis* and *Anastrepta orcadensis*) are present. Unique in Britain, its low level of grazing exploitation is unusual, suitable ecological study of upland vegetation less degraded than in most British mountains.	9.5km north.

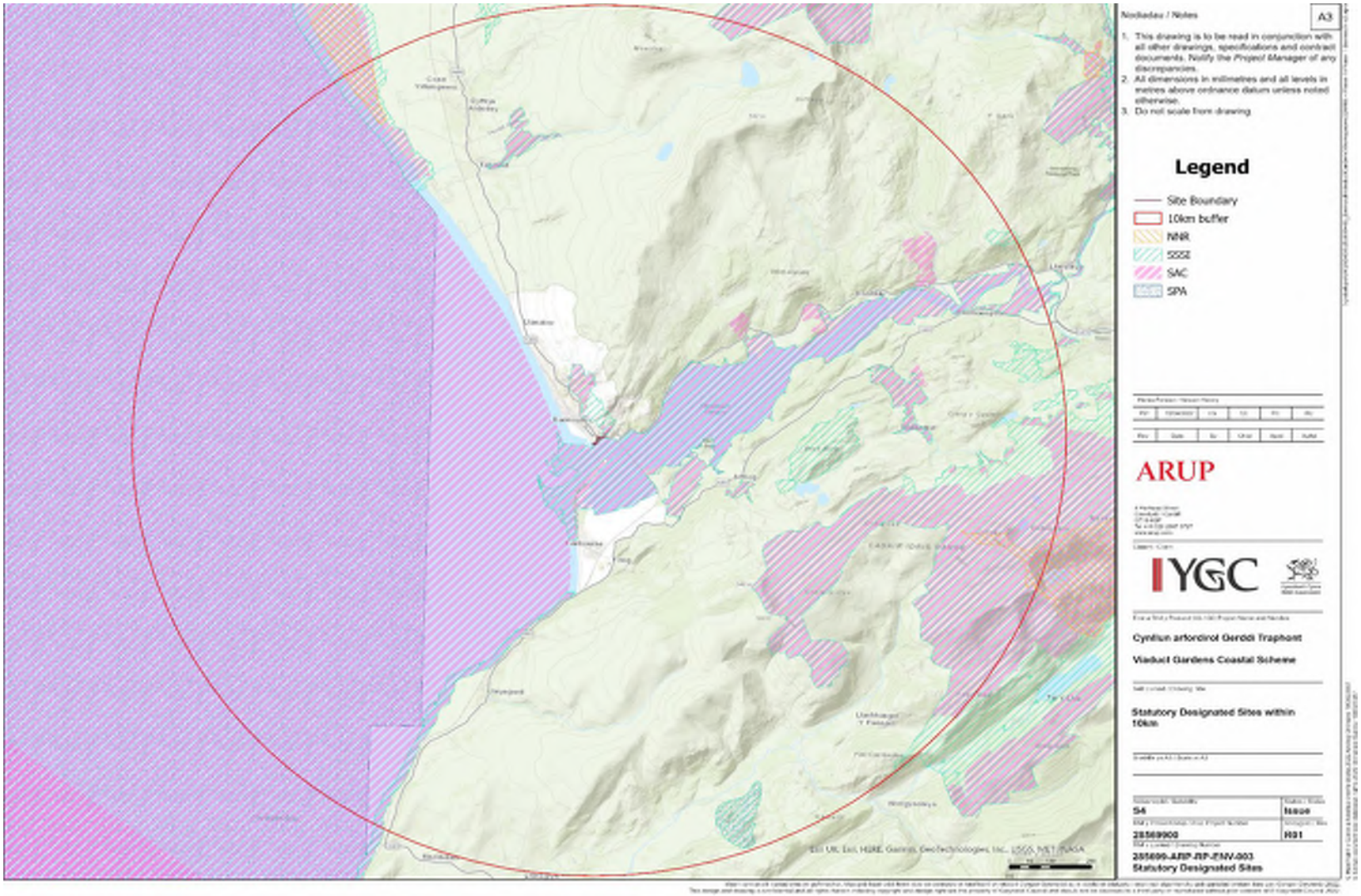


Figure 3.1: Location of statutory designated sites within 10km of site boundary[18]

[18] Multi-Agency Geographical Information for the Countryside (MAGIC), [Online] Available at: URL: https://magic.defra.gov.uk/MagicMap.aspx [Last Accessed: 07/04/2022]. Ordnance Survey 100022861.

3.1.2 Non-statutory designated sites

There are 30 non-statutory designated sites within 2.0km of the Site. St David's Church lies within the Site boundary. Two listed buildings, listed as 'Quay Cottage' and 'Former Wash-House Or Shop Advanced to the Right Of Quay Cottage', are within 50m of the Site. This list of Sites is comprised of Sites of Importance for Nature Conservation (SINCs), ancient woodland sites and a traditional orchard site, outlined in Table 3.2.

Table 3.2: Non-statutory designated sites

Designated site	Site features	Distance and direction from the site
Dinas Oleu SINC	Habitat includes dry dwarf shrub heath	78m north
Garn SINC	Habitat includes: dry heath/acid grassland mosaic; acid grassland	0.2km east at closest approach
Orielton Wood SINC	Habitat includes: broadleaved woodland; dry dwarf shrub heath	0.5km east
Ancient Woodland 25273	Restored Ancient Woodland Site	0.5km east
Ancient Woodland 24006	Ancient Semi Natural Woodland	0.5km east
Ancient Woodland 24007	Ancient Semi Natural Woodland	0.6km north east
Ancient Woodland 24015	Restored Ancient Woodland Site	0.6km north east
Ancient Woodland 24008	Ancient Semi Natural Woodland	0.7km north east
Ancient Woodland 24002	Ancient Semi Natural Woodland	0.8km north west
Wern Mynach SINC	Habitat includes: wet woodland; marshy grassland.	1.0km north west
Ancient Woodland 24009	Ancient Semi Natural Woodland	1.1km north west
Fegla Fawr Saltings SINC	Coastland. Grazed saltings of grass (*Puccinellia Festuca*) with some open mud and channels. *Carex punctata* and *Eleocharis quinqueflora* occur with lichen flora, *Anagallis minima* and *Radiola linoides* on slopes at east edge dependent upon maritime conditions.	1.1km south east
Ancient Woodland 24016	Restored Ancient Woodland Site	1.2km north west
Ffridd y Graig & south to Garn SINC	Habitat includes: acid grassland; dry dwarf shrub heath	1.2km north
Ancient Woodland 24011	Ancient Semi Natural Woodland	1.3km north west
Ancient Woodland 24015	Ancient Semi Natural Woodland	1.3km north east
Ancient Woodland 24004	Ancient Semi Natural Woodland	1.3km north west
Coed Glan y Mawddach SINC	Habitat includes: woodland - mixed, many exotic spp.	1.4km north east
Ancient Woodland 24003	Ancient Semi Natural Woodland	1.4km north
Ancient Woodland 24283	Restored Ancient Woodland Site	1.4km north east
Fegla Fawr Hill SINC	Heavily grazed rocky lowland (coastal) grassland. Oak woodland with a wide range of flowering plants, lichens bryophytes. Includes *Euonymus europaeus* and *Ophioglossum azoricum*, latter at SH62921490 to SH63001490 (now in SSSI)	1.5km north east

Designated site	Site features	Distance and direction from the site
Ceilwart-ganol SINC	Habitat includes: acid grassland; bracken	1.5km north west
Ancient Woodland 24017	Restored Ancient Woodland Site	1.5km north east
Ancient Woodland 42005	Ancient Semi Natural Woodland	1.5km north west
Ancient Woodland 25274	Ancient Semi Natural Woodland	1.5km south east
Traditional Orchards	GWYN0334	1.7km north west
Ancient Woodland 24278	Ancient Semi Natural Woodland	1.8km south east
Ancient Woodland 24284	Ancient Semi Natural Woodland	1.8km south east
Llwyn-on SINC	Peatlands. Basin mire of Erica/ Eriophorum with some sphagnum and *Juncus acutiflorus*	1.8km north east
Barmouth Junction Railway SINC	Disused railway line. *Foeniculum vulgare*, *Heracleum sphondylium*, *Hypericum perforatum*, *Lathyrus sylvestris*, *Lathyrus pratensis* and *Ononis repens* on railway ballast	1.9km south east

3.2 Habitats

3.2.1 Desk study

Several of the habitats within and adjacent to the study area are likely to be considered habitats of principal importance for the conservation of biodiversity as listed on Section 7 of the Environment (Wales) Act (2016). These are summarised below:

- Saline lagoon at Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC;
- Intertidal mudflats within Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC;
- Sheltered muddy gravels within Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC;
- Coastal grazing marsh surrounding Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC;
- Subtidal sandbanks present in Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC;
- Honeycomb worm (Sabellaria alveolata) reefs within Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC;
- Reedbeds within Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC;
- Upland oak woodland at Meirionnydd Oakwoods and Bat Sites SAC;
- Inland rock outcrop and scree habitat at of Barmouth Hillside SSSI and Dinas Oleu SINC;
- Coastal saltmarsh present in Mawddach Estuary SSSI and Lleyn Peninsula and the Sarnau SAC, adjacent to Barmouth Bridge and Fairbourne Spit;
- Coastal sand dunes situated south at Fairbourne Spit;
- Estuarine rocky habitats situated at south-west Barmouth and Fairbourne Spit;
- Traditional orchard situated 1.7km north-east of the Site; and
- Dry heath/acid grassland mosaic at Barmouth Hillside SSSI.

Furthermore, a total of 18 ancient woodland sites were identified within 2.0km of the study area. These habitats of principle importance for conservation are protected under Planning Policy Wales 2021[19] (Appendix A).

3.2.2 Field survey

Habitats within the survey area are described below. These should be read in conjunction with the Extended Phase 1 Habitat Survey Plan and associated target notes (Figure 4). The habitats are listed in the order found in the JNCC's Phase 1 Handbook.

3.2.2.1 A2.2 Scattered scrub

Scattered scrub is present within the church courtyard within he north-west of the Site, comprising rose (*Rosa* sp.) shrubs.

3.2.2.2 A 3.1 Broadleaved parkland/scattered trees

Broadleaved parkland trees are scattered within the Viaduct Gardens area, comprising entirely of cherry (*Prunus* sp.). Four cherry trees are scattered surrounding the border of the church courtyard.

[19] Welsh Government Planning Policy Wales Edition 11. February 2021. Planning Policy Wales - Edition 11 (gov.wales)

3.2.2.3 A3.2 Coniferous parkland/scattered trees

Coniferous parkland trees are scattered within the Viaduct Gardens area, comprising western red cedar (*Thuja plicata*).

3.2.2.4 H1.1 Intertidal mud/sand

There is a mosaic of intertidal habitat present within the northern aspect of the coastal area, between the south-facing sea wall and the north-facing slipway. A strip of intertidal bare sand is present within the Mawddach Estuary underneath Barmouth Bridge and on the south aspect of the Barmouth Bridge. Bare sand is present adjacent to the north-facing slipway and extends north towards the Barmouth Bridge, parallel with the iron fencing.

Intertidal bare sand is the only intertidal habitat present within the southern aspect of the site. This habitat is adjacent to the seawall and extends from the north-facing slipway southwards to the south-facing slipway. The tide within the southern aspect of the Site was above the coastal substrate level, therefore was surveyed from above the seawall, looking through the depth of the tide at the substrate below.

3.2.2.5 H1.1.3 Intertidal mud/sand with brown algal beds

Intertidal sand with sparse brown algal beds is present within the mosaic intertidal habitat that is situated in the northern area of the coastal habitat, between the south-facing sea wall and the north-facing slipway. It is grouped in two areas. A strip of this habitat is present adjacent to the east-facing seawall, on the north aspect of the north-facing slipway. It is adjacent to an area of intertidal boulders/rocks that have become established by brown algal beds Species present include egg wrack (*Ascophyllum nodosum*), bladder wrack (*Fucus vesiculosus*) and spiral wrack *(Fucus spiralis*).

3.2.2.6 H1.2 Intertidal shingles/cobbles

Intertidal shingle habitat is within the mosaic intertidal habitat that is situated in the northern area of the coastal habitat, between the south-facing sea wall and the north-facing slipway. It is present underneath the Barmouth Bridge, extending slightly south into the coastal area and stretching west parallel with the bridge. It is adjacent to artificial sea wall, which is present on its north and east aspect.

3.2.2.7 H1.2.2 Intertidal shingles/cobbles with green algal beds

Intertidal shingles with green algal beds are present in a small area within the mosaic intertidal habitat that is situated in the northern area of the coastal habitat. Species present include sea lettuce (*Ulva* sp).

3.2.2.8 H1.3 Intertidal boulders/rocks

Intertidal boulders and rocks are present within the mosaic intertidal habitat that is situated in the northern area of the coastal habitat, between the south-facing sea wall and the north-facing slipway. Boulders are present underneath the west aspect of the Barmouth Bridge and adjacent to the south-facing sea wall.

3.2.2.9 H1.3.3 Intertidal boulders/rocks with brown algal beds

Intertidal rocks with brown algal beds are present within the mosaic intertidal habitat that is situated in the northern area of the coastal habitat, between the south-facing sea wall and the north-facing slipway. The rocks extend from the east side of the Barmouth Bridge south-eastwards to the Site boundary. Species present include egg wrack, bladder wrack and spiral wrack.

3.2.2.10 I1.4 Other exposure

Rock exposure that has become colonised by vegetation, situated between Barmouth Sailors' Institute and Barmouth Bridge. Species present include willow (*Salix* spp.), ivy-leaved toadflax (*Cymbalaria muralis*), maidenhair spleenwort (*Asplenium trichomanes*), ivy (*Hedera* spp.), ribwort plantain (*Plantago lanceolata*), common dandelion (*Taraxacum officinale*), red valerian (*Centranthus ruber*) and cock's-foot (*Dactylis glomerata*).

3.2.2.11 J1.2 Amenity grassland

Amenity grassland is present within the Viaduct Gardens area and within the church courtyard. A mixture of species are present within these areas, including perennial ryegrass (*Lolium perenne*), common chickweed (*Stellaria media*), common daisy (*Bellis perennis*), ribwort plantain, common dandelion, forget-me-not (*Myosotis* spp.), bittercress (*Cardamine* spp.), rough hawkbit (*Leontodon hispidus*), and common yarrow (*Achillea millefolium*). Species present within margins included crane's-bill (*Geranium* spp.), lesser celandine (*Ficaria verna*), bramble (*Rubus* spp)., common daisy and white clover (*Trifolium repens*).

3.2.2.12 J1.4 Introduced shrub

Non-native shrubs have been planted for ornamental purposes within the Viaduct Gardens area to border the grassland area. Species present included *Phormium* spp., *Viburnum* spp. and family Cupressaceae.

3.2.2.13 J2.4 Fence

Iron fencing borders the Viaduct Gardens area, segregating it from the concrete path and road. Wooden fencing is present within the Viaduct Gardens area to form a bin store.

Iron fencing is present as a boundary between the promenade and the seawall edge, stretching along the south-west perimeter of the promenade.

Fencing is present within the church courtyard, segregating the courtyard on the south-east aspect of the church from the grassland on the north-east aspect of the church.

3.2.2.14 J2.5 Wall

Wall is present around the perimeter of the church gardens and borders the courtyards of residential houses and shops. Species identified growing on the wall included common polypody (*Polypodium vulgare*), maidenhair spleenwort, common sowthistle (*Sonchus oleraceus*), herb robert (*Geranium robertianum*), self-heal (*Prunella vulgaris*), moss (Bryophyta sp.) and ivy-leaved toadflax.

Wall is present behind buildings on the west aspect of the Quay, forming a barrier between the building's rear open space and public access. There is an inclined pathway on the west aspect of the wall that leads to residential housing and a hotel.

3.2.2.15 J3.5 Artificial sea wall

The seawall is present on the south-east aspect of the site, bordering where the land meets the coast. It extends from Frontage 1 southwards along Frontage 2. It is of masonry composite.

3.2.2.16 J3.6 Buildings

A range of residential, commercial, worship and leisure activity buildings are found within 50m of the site.

3.3 Protected and notable species

Records of protected and notable species within 2.0km of the proposed Scheme at Viaduct Gardens, Barmouth are listed below. All records below were observed during the last 10 years. Species-specific legislation is outlined in Appendix A.3. Records of bat roosts and badgers are sensitive and should be treated as confidential.

3.3.1 Mammals

3.3.1.1 Bats

Desk study

Bat species recorded during the last ten years within 2.0km of the Site comprise common pipistrelle and lesser horseshoe bat. A common pipistrelle was recorded foraging approximately 0.2km north-west of the Site at the Lion Hotel, Barmouth. Three lesser horseshoe bat roosts have been recorded, the closest record being that of a hibernation roost situated 1.5km north-east of the Site, near Panorama Walk.

Field survey

During the Extended Phase 1 Habitat survey, a rapid visual inspection of trees and buildings was carried out to identify whether further surveys would be required in order to assess the roosting potential of trees and buildings surrounding the Site. There were no trees within 50m of the Site that had potential to support roosting bats. At least three buildings were noted with potential to support roosting bats, including St David's Church, a public toilets block and residential housing. Exposed rock and cliff face habitat situated within 50m north of the Site also has potential to support roosting bats in voids or crevices such as cracks, breaks and flakes[20]. Suitable foraging habitat is also present within surrounding designated sites, including areas of scrub present on the rock face and scrub and trees present within 50m north-east of the Site.

3.3.1.2 Riparian mammals

Desk study

No records of water vole (*Arvicola amphibius*) were returned within 2.0km of the Site. A total of three records of otter were found within 2.0km of the Site. The closest record is a sighting of a foraging otter approximately 0.4km south of the Site at Barmouth Breakwater, Gwynedd. Other evidence of otter includes spraints, footprints and feeding remains. It is important to note that Cofnod returned records of breeding populations within 2.0km of the Site prior to the year 2012 where one adult female was observed with two pups, and on a separate occasion a lactating female was recorded. Woodland is situated within Orielton Wood nearby which may be suitable for holts and other resting sites. Reedbeds within Mawddach Estuary are suitable for resting and breeding sites for otter.

Field survey

During the Extended Phase 1 Habitat Survey, no evidence of otter or water vole was found. Suitable habitat for otter is present within 50m of the Site, including shallow, inshore marine areas for feeding and the open, low-lying coast, with a connected river Afon Mwaddach for commuting. Whilst carrying out the Extended Phase 1 Habitat Survey, a conversation with a local resident informed that an otter was observed on the promenade in the southern area of the Site in 2017. No suitable habitat for water vole was recorded within 50m of the Site.

3.3.1.3 Badger

Desk study

A single badger (*Meles meles*) record was found within 2.0km of the Site. The live badger was observed approximately 1.0km north-west of the Site on the A496 roadside.

Field survey

During the Extended Phase 1 Habitat Survey, no evidence of badger or was recorded within 50m of the Site. Suitable foraging habitat may be present within residential and public gardens, such as St David's Church courtyard and Viaduct Gardens. Although suitable soil for sett creation is present within 50m of the Site, there is a low amount of hedgerow and woodland cover within these areas and is situated adjacent to residential housing, a footpath, and the A496. Due to likely disturbance in these areas, it is unlikely for a badger sett to be created within the survey area.

3.3.1.4 Other notable species

Desk study

Species listed under Section 7 Environment (Wales) Act 2016 have been recorded within 2.0km of the Site within the last 10 years. Eight records of hedgehog (*Erinaceus europaeus*) were found within 2.0km of the

[20] Bat Rock Habitat Key, 2021. *Bats Roost in Rock – A Guide to Identification and Assessment for Climbers, Cavers & Ecology professionals*. Pelagic Publishing, Exeter.

Site. The closest record is a live sighting within the site boundary, near St David's Church. One record of brown hare (*Leus europaeus*) was found approximately 1.0km north of the Site, within a field. Five records of polecat (*Mustela putorius*) was found approximately 0.2km north of the Site, within Dinas Oleu SINC. No evidence of bottlenose dolphin has been recorded within 2.0km of the Site, however it is one of the species for which Lleyn Peninsula and the Sarnau SAC is designated.

Field survey

No evidence of notable species was recorded during the Extended Phase 1 Habitat survey. Suitable habitat within 50m of the Site includes gardens within urban areas that may be used by foraging hedgehogs and may provide opportunity for breeding, resting and hibernation.

3.3.2 Birds

Desk study

Records of 611 birds were returned within 2.0km of the Site comprising 104 species. The following WCA Schedule 1 species were included[21]:

- Peregrine (Falco peregrinus);
- Red kite (*Milvus milvus*);
- Whimbrel (*Numenius phaeopus*);
- Chough;
- Barn owl;
- Great northern diver (*Gavia immer*);
- Osprey (*Pandion haliaetus*);
- Whooper swan* (*Cygnus cgnus*);
- Brambling* (*Fringilla monitifringilla*);
- Black redstart (*Phoenicurus ochruros*);
- Redwing* (*Turdus iliacus*);
- Common scoter (*Melanitta nigra*);
- Mediterranean gull (*Ichthyaetus melanocephalus*); and
- Cetti's warbler (*Cettia cetti*).

The closest record was that of chough, where their presence has been recorded at Barmouth Hillside SSSI adjacent to the Site.

Records of 324 birds listed within Birds of Conservation Concern (BoCC)[22,23] are present within 2.0km of the Site comprising 25 species of Red (R) and 35 species of Amber (A) status. Species of particular concern within this list include wading bird species bar-tailed godwit (*Limosa lapponica*) (R), curlew (*Numenius*

[21] Although records of Schedule 1 birds are present within 2.0km of the survey area, it is unlikely for some of these species to breed within 50m of the survey area due to availability of suitable habitat. Schedule 1 species unlikely to breed within the survey area are marked with an asterix (*).

[22] Stanbury, A., Eaton, M., Aebischer, N., Blamer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D. & Win, I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds*, 114: pp.723-747.

[23] Johnstone, I. & Bladwell, S. (2016). Birds of Conservation Concern in Wales 3: the population of birds in Wales. *Birds in Wales*, 13: pp.3-11.

arquata) (R), lapwing (*Vanellus vanellus*) (R), ringed plover (*Charadrius hiaticula*) (R) and overwintering wading species whimbrel (A) and common redshank (*Tringa totanus*) (R). Lleyn Peninsula and the Sarnau SAC and Mawddach Estuary SSSI provide suitable habitat for these birds. Additionally, Barmouth Hillside SSSI supports chough (A) throughout the year and has visitors throughout the year including pied flycatcher (*Ficedula hypoleuca*) (R), black redstart (*Phoenicurus ochruros*) (A) and wood warbler (*Phylloscopus sibilatrix*) (R).

Field survey

Wood pigeon (*Columba palumbus*) was observed nesting on Barmouth Bridge within Viaduct Gardens area, on the south-facing side of the bridge. Suitable habitat within 50m of the Site for nesting and/ or foraging wading, breeding and/ or overwintering birds includes areas within Mawddach Estuary SSSI, sand dunes, sandflats, rocky shores, cliff edges and crevices of rock faces, clusters of trees, scrub and bare ground.

3.3.3 Herpetofauna

Desk study

Four records of common lizard (*Zootoca vivipara*) were returned within 2.0km of the Site. The closest record was found 0.1km north of the Site on a private garden wall. A single record of adder (*Vipera berus*) was returned within 2.0km of the Site. The adder was a juvenile female found on a footpath of Dinas Oleu SINC.

No records of amphibians, including great crested newt (*Triturus cristatus*), were returned within 2.0km of the Site. The only standing waterbody present within 2.0km of the Site was situated 1.8km south of the Site, within a field that may sometimes be dry. This waterbody is situated across the Mawddach Estuary and Barmouth Bridge. It is unlikely to contain great crested newts and unlikely to be impacted by the proposed works, therefore does not require further survey. It is unlikely that great crested newts are present within the survey area and have been descoped for the remainder of the report. Furthermore, GCN are generally absent from this region of Wales, although some sightings have been recorded at Llanbedr 11.7km north[24].

Field survey

No evidence of reptiles or amphibians was recorded during the Extended Phase 1 Habitat survey, although it is noted that the survey was undertaken outside of the optimal time of year for herpetofaunal surveys. Habitats within 50m of the Site including cliff, exposed rock, gardens, sand, walls and scrub provide suitable foraging and basking habitat for reptiles including common lizard and adder. No suitable amphibian habitat was recorded during the Phase 1 Habitat survey.

3.3.4 Fish

Desk study

No fish were recorded as present within 2.0km of the Site during the last ten years.

Field survey

Common goby (*Pomatoschistus microps*) was recorded within the estuary during low-tide, underneath rock within the intertidal habitat. The mosaic of habitat within the estuary provides opportunity for many species that thrive in intertidal habitat.

[24] Review of the Current Conservation Status (CCS) of the Great Crested Newt in Wales, with specific references to its long term prospects and within its stronghold in NorthEast Wales. 2018. NRW and Amphibian and Reptile Conservation Trust, Report No. 259. https://cdn.naturalresources.wales/media/687859/eng-evidence-report-259-review-of-the-current-conservation-status-ccs-of-the-great-crested-newt-in-wales.pdf

3.3.5 Invertebrates

Desk study

The desk study returned records of 22 invertebrate species within 2.0km of the Site. A total of 36 records of invertebrates listed under Section 7 of the Environment (Wales) Act (2016) were found, comprising the species listed below:

- Wall brown (*Lasiommata megera*) 0.5km north-east
- Forester (*Adscita statices*) 1.9km north-west
- Small pearl-bordered fritillary (*boloria selene*) 0.2km north
- Grayling (*Hipparchia Semele*) 0.6km north
- Small heath (*Coenonympha pamphilus*) 0.2km north

The closest records of Section 7 invertebrates were located 0.2km north of the Site within Dinas Oleu SINC.

Field survey

The mosaic of grassland, scrub, cliff, sand and intertidal habitats on Site are considered to be suitable to support a range of notable terrestrial and aquatic invertebrates, with good connectivity to the wider landscape.

White-clawed crayfish (*Austropotamobius pallipes*) are not considered likely to be present within the estuarine habitats on Site, due to suspected unfavourable brackish and saltwater environment and habitat substrate (bare mud/sand) and are rarely found in North West Wales..

3.3.6 Protected flora

Desk study

Four records of bluebell (*Hyacinthoides non-scripta*), which is listed under Schedule 8 of WCA, were returned within 2.0km of the Site. The closest record is situated 0.9km south of the Site.

A single record of prickly saltwort (*Salsola kali subsp. kali*) , listed under Section 7 of the Environment (Wales) Act (2016), was returned within 0.3km of the Site.

Field survey

No species of protected flora were recorded during the Extended Phase 1 Habitat survey. It is noted that the survey was undertaken outside of the optimal time of year for vegetation surveys and so a full vegetative survey was not undertaken. In particular, it is considered likely that the mosaic of sand and grass habitats to the south of the Site could support notable plant species, in addition to the grass and cliff mosaic habitat within the Site.

3.3.7 Invasive non-native species

Desk study

A total of 48 records of invasive, non-native species (INNS) of fauna and flora listed under Section 9 of the WCA and the Invasive Alien Species (Enforcement and Permitting) Order 2019 were returned from the data search.

Thirteen records of Canada goose (*Branta canadensis*) were found within 2.0km of the Site, the closest record approximately 0.1km south-east of the Site.

A total of six floral INNS were recorded within 2.0km of the Site, they are listed below:

- Rhododendron (*Rhododendron ponticum*);
- Himalayan balsam (*Impatiens glandulifera*);

- Himalayan cotoneaster (*Cotoneaster simonsii*);
- Japanese knotweed (*Reynoutria japonica*);
- Japanese rose (*Rosa rugosa*); and
- Montbretia (*Crocosmia pottsii x aurea = C. x crocosmiiflora*).

The closest records include Japanese rose approximately 0.1km west of the Site, in addition to Japanese knotweed and montbretia approximately 0.1km south-east of the Site.

Field survey

No INNS were recorded within 50m of the Site during the Extended Phase 1 Habitat survey, although the survey was undertaken outside of the optimal survey period. An INNS survey will be undertaken by a suitably qualified ecologist during the optimal survey period.

4. Recommendations

Recommendations for further consultation, further species surveys or general best practice mitigation to minimise impacts of the proposed works on habitat and species are stated below, in line with PEA guidance. Measures to enhance biodiversity are also recommended in this section.

In general, the following best-practice measures should be considered when designing the construction phase of the works (subject to further surveys being undertaken)[25]:

- A toolbox talk should be given to all contractors working within the site by a Suitably Qualified Ecologist (SQE) prior to works, detailing the potential for protected species/habitat within the site, the working methods to be employed and the procedure to follow should any species be identified. A record of attendance should be kept on site, which contractors should sign to indicate they have understood the toolbox talk; and
- A Construction Environmental Management Plan (CEMP) should be produced and should be maintained by the Contractor during the construction phase. This will include site-specific methods to ensure that all site activities, especially those in proximity to watercourses and waterbodies are controlled and are in accordance with relevant legislation and undertaken in compliance with the relevant Guidelines for Pollution Prevention (GPP/PPG[26]) and industry best practice (GPP5[27], CIRIA[28]).

4.1 Designated sites

Lleyn Peninsula and the Sarnau SAC and Mawddach Estuary SSSI are situated within the Site boundary, designated for its sandbanks, estuaries, coastal lagoons, large shallow inlets and bays, and reefs. Due to the location of the SAC and SSSI within the Site, impact pathways to designated features and potential for effect will be outlined within a Habitats Regulations Assessment (HRA).

Meirionnydd Oakwoods and Bat Sites SAC (20m north of the proposed works) is designated for its lesser horseshoe bat populations, including maternity roosts and hibernacula. Barmouth Hillside SSSI, forming part

[25] Further to additional surveys, it may be necessary to change the recommendations provided below for during the clearance and construction phases and provide additional recommendations for mitigation based on the presence of protected species or notable habitats.

[26] http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/ [Accessed: 28/03/2022]

[27] Natural Resources Wales (NRW), the Northern Ireland Environment Agency (NIEA), Scottish Environment Protection Agency (SEPA) (2018). Guidance for Pollution Prevention – Works or maintenance in or near water: GPP5 v1.2 Feb 2018. http://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf [Accessed: 28/03/2022]

[28] CIRIA (2018) CIRIA http://www.ciria.org [Accessed: 28/03/2022]

of the Meirionnydd Oakwoods and Bat Sites SAC, is notified for its geology and has potential to provide suitable hibernacula for this species. Impact pathways to designated features and potential for effect by the works will be outlined within a HRA These suitable bat habitats are within close proximity to potential bat buildings that were identified within the survey area, in particular St David's Church, as such there is potential for species to commute to the SSSI/ SAC for foraging.

As a result of recent case law as ruled by the European Court of Justice[29], mitigation measures cannot be included within the Screening stage of the HRA, and therefore any potential pathways for effect will need to be evaluated within a Stage 2: Appropriate Assessment. Mitigation measures may need to be considered for roosting and commuting bats within this assessment, for example avoiding nightworks or inclusion of sensitive task-lighting (if required), minimisation of vegetation removal (particularly where linear flightlines could be affected) and air quality management including wetting of construction dust.

Three hydrologically connected sites (North Cardigan Bay SPA, Morfa Harlech a Morfa Dyffryn SAC and Morfa Dyffryn NNR) are situated at least 3.5km away, after the Mawddach Estuary has dispersed into Barmouth Bay. Mitigation measures will be carried out in compliance with CIRIA C532 'Control of water pollution from construction sites' guidance[30] to ensure there is minimal risk of hydrological contamination. It is currently considered unlikely that the works will have a significant impact on the surrounding designated sites, however this is subject to change as the scope of works and methodology become more defines. The likelihood of significant effect of the works on designated sites will be fully assessed and reported within the HRA.

Internationally designated sites listed below are at a distance of at least 4.3km from the Site. As a result, the proposed works are unlikely to have a significant impact on these sites:

- Cadair Idris SAC;
- Cadair Idris NNR;
- Craig yr Aderyn (Bird's Rock) SPA; and
- Rhinog SAC.

The likelihood of a significant impact of the works on internationally designated sites will be fully assessed and reported within the HRA.

Fifteen SSSIs are situated over 2.5km away from the Site. The proposed works are unlikely to have a significant impact on these sites due to this distance.

4.2 Habitats

Works have the potential to cause destruction of habitats within, directly adjacent or hydrologically connected to the Site, including ancient woodland and several habitats likely to be considered habitats of principal importance for the conservation of biodiversity as listed on Section 7 of the Environment (Wales) Act 2016. These are summarised below:

- Saline lagoon;
- Intertidal mudflats;
- Sheltered muddy gravels;
- Coastal grazing marsh;

[29] ECJ (2018). People over Wind, Case C323/17 European Court of Justice, 12th April 2018.

[30] Masters-Williams, H., Heap, A., Kitts, H., Greenshaw, L., Davis, S., Fisher, P., Hendrie, M. & Owens, D. (2001). CIRIA C532: Control of water pollution from construction sites – guidance for consultants and contractors. CIRIA: London.

- Subtidal sandbanks;
- Honeycomb worm reefs;
- Reedbeds;
- Upland oakwood;
- Inland rock outcrop and scree habitat;
- Coastal saltmarsh;
- Coastal sand dunes;
- Estuarine rocky habitats;
- Ancient semi-natural woodland and restored ancient woodland; and
- River.

Further priority habitat may also be present in the wider landscape from the survey area.

An intertidal survey was carried out on 29th March 2022. The survey was undertaken during suitable daylight hours around spring tides, with suitable weather conditions. An Intertidal Survey Report will be completed separately to the PEA.

The development proposals at the site should seek to avoid impacts to habitats of ecological value where possible. Where avoidance of such habitat is not possible, their loss or damage should be minimised. Works in the vicinity of the estuary and intertidal zone will utilise pollution prevention measures to minimise silt dispersed downstream during works around the watercourse and spillway. Any loss of valuable habitat should be adequately mitigated through offsetting and enhancement in order to comply with national and local planning policy, reinstated on at least a like-for-like basis, and clear biodiversity gains should be demonstrated.

The recommendations provided here are based on a preliminary appraisal of the ecological value within the Site. The results of further surveys should be used to refine priorities for habitat retention within the development design, and to inform mitigation design for unavoidable losses of valuable habitats.

4.3 Protected and notable species

There is potential for several protected or notable faunal species to occur at the Site. These species represent constraints to the proposed works as summarised below.

4.3.1 Bats

Bats are protected under the WCA and the CHSR. They are protected from disturbance, capture, injury and killing and their roosts are protected from obstruction, damage or destruction.

During the Extended Phase 1 Habitat Survey, at least three buildings were noted with potential to support roosting bats, including St David's Church, a public toilets block and residential housing. Suitable foraging habitat is also present within surrounding designated sites. Under the current scope of works, it is unlikely that buildings within the Site will be significantly impacted by the works and therefore a Preliminary Roost Assessment (PRA) is not currently required. Requirement of a PRA is to be kept under review in the case that the scope of works is altered to directly impact buildings and/or cause significant indirect impacts from works vibrations. If required, further surveys of potential roosting features will follow the guidelines as detailed in the Bat Conservation Trust Good Practice Guidelines[31].

[31] Collins, J> (ed.) (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). The Bat Conservation Trust: London.

Although no winter foraging habitat is present within the site boundary, bats from within the designated sites may still fly within range of the proposed works if carried out during winter. Measures to avoid disturbance should be considered within the detailed design with potential important foraging and commuting features retained as far as possible.

If temporary construction lighting is required during the bat activity season for works, this would consist of directional lighting using hoods or cowls designed to ensure no light spill over 0.5 Lux on to any potential commuting and foraging areas. Details of a sensitive lighting plan will need to be included within the CEMP for any night-time/ dusk working. The lighting design will need to follow best practice guidance by the Bat Conservation Trust and the Institution of Lighting Professionals[32].

4.3.2 Otter

Otters are protected under the WCA and CHSR. Under this legislation, they are protected from disturbance, capture and injury/killing. Their breeding sites and resting places are also protected from damage and destruction.

Suitable habitat for otter is present within 50m of the Site, including shallow, inshore marine areas for feeding and the open, low-lying coast, with a connected river Afon Mwaddach for commuting and woodland situated within Orielton Wood nearby which may be suitable for holts and other resting sites[33]. Reedbeds within Mawddach Estuary are also suitable for resting and breeding sites. Whilst carrying out the Extended Phase 1 Habitat Survey, a conversation with a local resident informed that an otter was observed on the promenade in the southern area of the Site in 2017. Records of otter are also present within 0.4km of the Site.

The current scope of works is unlikely to significantly impact local otter populations, however due to activity recorded within the area a precautionary method of works must be in place prior to construction. The requirement for further otter surveys will be kept under review until the detailed design of the works is completed. If further surveys area required, they should follow the best practice survey guidelines[34]. If otter resting places and/or holts are found to be present within the vicinity of the proposed works, a protected Species Licence for otters may be required from NRW. Pre-construction surveys maybe required as part of the licence conditions to identify any new evidence of otter resting sites on Site and allow for amendments to any Licence requirements. Pollution prevention measures will be included within the CEMP to avoid impact to surrounding habitat.

4.3.3 Badger

Badgers are protected under the Protection of Badgers Act 1992. They are protected from disturbance (while in their setts), injury and killing. Setts are protected from obstruction, damage or destruction.

The closest record of a badger was a sighting approximately 1.0km north-west of the Site on the A496 roadside. Badgers are nocturnal, may be active within urban areas during the night and can move into an area and establish setts quickly. The current scope of works is unlikely to significantly impact local badger populations and further badger surveys are not required, however a precautionary method of works should be in place prior to construction. If a badger sett is identified at the time of survey consideration would need to be given to obtaining a licence from NRW or Welsh Government in order to authorise the damage or loss of badger setts, which would otherwise be illegal.

General measures also should be included in the CEMP to avoid entrapment or harm to badgers. Excavations should be covered when works are not taking place, especially overnight. Where deep excavations are made, a mammal ladder, or cut access, should be installed to allow badgers a means of escape from the trench. Any temporarily exposed open pipes should be capped to ensure that badgers cannot enter them.

[32] https://cdn.bats.org.uk/uploads/pdf/Resources/ilp-guidance-note-8-bats-and-artificial-lighting-compressed.pdf?v=1542109349

[33] https://sac.jncc.gov.uk/species/S1355/

[34] https://ptes.org/house-a-dormouse/dormice-in-decline/current-dormouse-distribution-map/

4.3.4 Other notable mammal species

Any action that intentionally inflicts unnecessary suffering on any wild animal is an offence under the Wild Mammals (Protection) Act 1996. Should wild mammals be encountered during vegetation clearance and ground breaking works, the mammals will need to be moved to safe place by a suitably qualified ecologist.

The retention of existing habitats and the design of new habitat corridors within the Site should consider habitat requirements of hedgehog and polecat, with a focus on maintaining permeability across the site for these species.

4.3.5 Birds

All wild birds, their young and nests are protected under the WCA from taking, injury and killing. Birds under Schedule 1 of the WCA are also protected against disturbance while nesting. Wood pigeons nest year-round and were identified nesting on Barmouth Bridge during the Extended Phase 1 Habitat survey. No further signs of breeding birds were observed during the survey. Due to the urban nature of the Site, it is not anticipated that Schedule 1 species such as chough are likely to be present within the Site, and significant impact is not anticipated for Schedule 1 birds and breeding bird species. Surveys for breeding, wading, winter and Schedule 1 bird species are unlikely to be required, however requirement for surveys may change subject to further development of the design detail.

Any vegetation clearance required in the finalised design detail (year-round with consideration of potential for earlier-nesting species) should be subject to a toolbox talk and supervised by an ecologist (or checked by an ecologist no more than 24 hours prior to clearance). If a nest is identified within or close to vegetation to be removed then it must be left in-situ and protected from the works, with no further works in the area until the young birds have fledged from the nest. It is also important to consider the potential presence of ground-nesting birds such as ringed plover, in particular with works close to the coast. The suitable buffer of works to prevent disturbance and length of time for birds to fledge is dependent upon species identified. Should further bird surveys be required prior to construction, species recorded as present may require further consideration to be given to the timings of the works, in addition to the potential requirement for Schedule 1 bird licensing application.

4.3.6 Reptiles and amphibians

Reptiles are protected from reckless or intentional harm under the WCA. The need for reptile mitigation is dependent upon completion of the detailed design of the works. Within the current scope of works, no reptile mitigation is required, however this must be kept under review until the detailed design of works is finalised. Any required vegetation clearance should be undertaken between April and the end of October, whilst reptiles and amphibians are active using a reptile sensitive methodology. Vegetation clearance should be undertaken in a directional manner towards suitable habitat under ecological supervision. Suitable hibernation features (such as riprap and log piles) should be removed by hand or by hand tools under ecological supervision. The features that are dismantled should be reinstated within a suitable location outside of the works area or removed from site.

A toolbox talk should be provided to all those working on site. If evidence of reptiles or amphibians is found, work should cease until advice has been obtained from the site ecologist.

4.3.7 Invertebrates

The mosaic of habitats within the survey area are considered to be suitable to support a range of notable invertebrates, although connectivity to the wider landscape is potentially limited by the surrounding cliff and sea. Measures to protect sensitive features, including removal of log piles outside of the construction area, and following site best-practice including pollution prevention guidelines will be of benefit to invertebrate species.

Potential enhancements for invertebrates include habitat design, such as creation of species-diverse habitats designed to enhance resource for notable invertebrates within the local vicinity.

4.3.8 Fish

The works have the potential to cause disturbance/killing/injury of fish within the Mawdach Estuary SSSI, Lleyn Peninsula and the Sarnau SAC and surrounding waterbodies. In order to avoid this, pollution prevention measures will be secured via the CEMP.

4.3.9 Invasive non-native species

Schedule 9 of the WCA and The Invasive Alien Species (Enforcement and Permitting) Order 2019 makes facilitating the spread of listed invasive species an offence.

No invasive species were recorded during the Extended Phase 1 Habitat survey. However, this survey was conducted out of the growing season, and as such it is recommended that a survey to accurately map the INNS within the Site is conducted in spring and summer, to ensure all INNS are recorded through their respective growing and flowering seasons.

Japanese rose, Japanese knotweed and montbretia were recorded within 0.1km of the Site. INNS can require multiple years of treatment to eradicate them from a site. It is recommended that a treatment plan to remove the above Japanese knotweed takes reference to the Invasive Non-native Specialists Association (INNSA) code of practice guidelines for managing Japanese Knotweed[35].

4.4 Enhancement measures

Measures are recommended to enhance the biodiversity within the site and surrounding area, these will need to be implemented in line with national policy (see section 1.4) during design, construction and operation. These could include:

- The deployment of bird and bat boxes on retained trees within or near to the survey area;
- The installation of planters and insect hotels within amenity grasslands to increase and protect biodiversity of local species within an urban environment[36];
- The installation of otter holts to enhance the opportunities for otter resting and breeding within the surrounding area of the Site;
- Removal of INNS within proximity to the Site;
- The inclusion of further logs/brash piles to encourage invertebrates and also act as a refuge for reptiles, amphibians and small mammals. Enhancement products suitable for urban environments are available[37];
- Implementation of a Site-wide INNS management plan to remove Japanese knotweed from within vicinity of the Site;
- Retrofitting or including pocket rock pools onto vertical sea defences, such as vertipools discussed with Swansea University;
- Tidal habitat enhancement measures include ecological enhancement techniques to improve habitat heterogeneity on coastal defence structures, such as examples outlined in Hall et al., (2018)[38] creating grooves within the coastal defences; and

[35] INNSA-Code-of-Practice.pdf (accessed 02/04/2022}.

[36] For example, Vestre Habitats series https://vestre.com/uk/products/habitats/habitats-leaf-2-2-2-2-2 [Accessed 19/04/2022]

[37] For example Vestre Pile bench allows large stones and gravel to be easily arranged into small piles < https://vestre.com/uk/products/habitats/habitats-pile> [Accessed 19/04/2022]

[38] Hall et al. (2018). Ecological enhancement techniques to improve habitat heterogeneity on coastal defence structures. Available online at: https://doi.org/10.1016/j.ecss.2018.05.025. (Accessed: 04/04/2022)

- Potential to collaborate with Living Seawalls[39] to incorporate bespoke habitat units that are both aesthetically pleasing and ecologically valuable into the seawall design. Further opportunities for tidal habitat enhancement measures will be outlined within the Intertidal Survey Report.

Some enhancement options may be eligible dependent upon landowner permissions and subject to suitable land for installation.

[39] https://www.livingseawalls.com.au/

5. Summary and Conclusions

There are nine internationally designated sites within 10.0km of the Site, Lleyn Peninsula and the Sarnau SAC of which is situated within the site boundary, designated for its marine habitats and marine wildlife populations. A Habitats Regulations Assessment will be required for any proposed works within the Site. A further 18 statutory designated sites were identified within 10.0km of the Site, including Meirionnydd Oakwoods and Bat Sites SAC situated adjacent to the Site and SSSIs located within and adjacent to the Site. There are 90 non-statutory designated Sites within 2.0km of the Site, including ancient woodland and SINCs.

Habitats assessed during the field survey included: improved grassland, amenity grassland, cliff, exposed rock, structures, scrub, trees, sand, and intertidal sand/shingle/rocks/boulders with/without brown or green algal beds and running water (Afon Mawddach).

The Site has potential to support birds (including wading and overwintering birds), otter, foraging and roosting bats, reptiles, invertebrates and other Section 7 species, including notable and localised plant species. Japanese knotweed has been identified within 0.1km of the Site. A further survey at the optimal time of year for INNS is recommended.

The requirement for additional (Phase 2) ecological surveys is dependent upon the selected construction design and methods should be kept under review; potential additional survey efforts include for bats and otter.

This report is a result of survey work undertaken in February 2022. This report refers, within the limitations stated, to the condition or proposed development of the Site at the time of the inspections. Changes in legislation, guidance, best practice, etc. may necessitate a re-assessment/survey. It is also advised that if there is a delay of over two years in undertaking the works, an updated walkover survey is undertaken to ensure the baseline conditions have not changed. No warranty is given as to the possibility of future changes in the condition of the Site.

This report is produced solely for the benefit of Ymgynghoriaeth Gwynedd Consultancy - Gwynedd Council and no liability is accepted for any reliance placed on it by any other party. This report is prepared for the proposed uses stated in the report and should not be used in a different context.

Appendix A

Legislation and Policy

A.1 Legislative Context

A framework of international, European, national and local legislation and planning policy guidance exists to protect and conserve wildlife and habitats. This is described in the following sections. The reader will refer to the original legislation for the definitive interpretation.

A.2 Designated Sites

A network of nationally designated sites has been established through the designation of Sites of Species Scientific Interest (SSSI) under the Wildlife and Countryside Act 1981 (as amended). The protection afforded by the Act means it is an offence to carry out or permit to be carried out any operation listed within the notification without the consent of the Statutory Nature Conservation Organisation[40] (Natural England). The protection afforded to SSSIs is used to underpin the designation of areas at a European Level. European Sites comprise:

- Special Areas of Conservation (SAC) designated under the Conservation of Habitats and Species Regulations 2019 (Amendment) (EU Exit) (known as the Habitats Regulations);
- Special Protection Areas (SPA) designated under the Wildlife and Countryside Act.

Wetlands of International Importance (Ramsar sites) declared under the Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 are normally also notified as SSSIs but are only considered European Sites as a matter of UK and Local Government Policy.

The Habitats Regulations transpose the requirements of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) into law within England and Wales, while the Wildlife and Countryside Act transposes Directive 79/409/EEC on the Conservation of Wild Birds (the Birds Directive) in the law within England and Wales. Equivalent legislation exists to transpose these directives in the law within Scotland and Northern Ireland.

The Habitats Regulations require that consideration is given to the implications of plans and projects (developments) on European Sites are considered. Specifically, Regulation 61(1) states:

"A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which –

(a) is likely to have a significant effect on a European site or European marine site (either alone or in combination with other plans or projects); and

(b) is not directly connected with or necessary to the management of that site, must make an appropriate assessment of the implications for that site in view of that site's conservation objectives."

The formal consideration of effects on European Sites is therefore undertaken by the determining authority such as the Local Planning Authority.

Local Nature Reserves can be given protection against damaging operations through powers within the National Parks and Access to the Countryside Act 1949 (as amended). However, this protection is usually

[40] Section 28 of the Wildlife and Countryside Act 1981 (as substituted by Schedule 9 of the Countryside and Rights of Way Act 2000).

conveyed through inclusion of protection within local planning policy relating to these sites and other non-statutory sites such as sites of Importance for Nature Conservation.

These sites are protected by the relevant legislation regardless of whether planning permission is required. Where planning consent is required, they will also be protected by Planning Policy.

Country Parks, Sites of Importance for Nature Conservation (SINC), and Ancient Woodlands are protected by Planning Policy, which will apply to schemes which require planning consent.

A.3 Protected and Notable Species

A.3.1 European Protected Species

The Habitats Regulations convey special protection to a number of species which are listed in schedule 2 of the Regulations and are referred to a European Protected Species (EPS):

- All UK resident bat species;
- All whale and dolphin species;
- Large blue butterfly (*Maculinea arion*);
- Hazel dormouse (*Muscardinus avellanarius*);
- Pool frog (*Rana lessonae*);
- Sand lizard (*Lacerta agi*lis);
- Fisher's estuarine moth (*Gortyna borelii lunata*);
- Great crested newt (*Triturus cristatus*)
- European otter (*Lutra lutra*);
- Wild cat (*Felis silvestris*);
- Lesser Whirlpool Ram's-horn Snail (*Anisus vorticulus*);
- Smooth snake (*Coronella austriaca*);
- Sturgeon (*Acipenser sturio*);
- Natterjack toad (*Bufo calamita*); and
- All marine turtles.

Regulation 41 makes it an offence to:

a) Deliberately capture, injure or kill any wild animal of a EPS;

b) Deliberately disturb wild animals of such a species;

c) Deliberately takes or destroys the eggs of such a species; and

d) Damages or destroys a breeding site or resting place of such an animal.

Disturbance in the context of the offences above is disturbance which is likely to impair the ability of the animals to survive, to breed or reproduce, to nurture their young, to hibernate, to migrate; or to affect significantly the local distribution of the species.

Licences can be granted by the relevant SNCO for developments (sometime referred to as EPS Licences or Derogation Licences) providing the purposes of the licence is for *"preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment".*

A.3.2 UK Protected Species

A.3.2.1 Wildlife and Countryside Act 1981

The Wildlife and Countryside Act 1981 provide protection to both EPS and other species including wild birds, water voles and reptiles.

All wild birds, their nests and eggs are protected with some rare species afforded extra protection from disturbance during the breeding season (these species are listed in Schedule 1 of the Act). It is illegal to take any wild bird or damage or destroy the nests and eggs of breeding birds. There are certain exceptions to this in respect of wildfowl, game birds and certain species that may cause damage.

In England and Wales water voles are listed on Schedule 5 of the Wildlife and Countryside Act 1981, receiving full protection since 2008. The Wildlife and Countryside Act 1981 together with amending legislation, lists the following offences:

- Intentionally killing, injuring or taking a water vole by any method;
- Intentionally or recklessly damaging or destroying a water vole place of shelter or protection;
- Intentionally or recklessly damaging disturbing a water vole whilst it is occupying such a structure or place it uses for shelter or protection;
- Intentionally or recklessly obstructing access to a water vole's place of shelter or protection;
- Selling, offering for sale, or possessing or transporting for the purposes of sale, any live or dead water vole, or any part or derivative, or advertising any of these for buying or selling.

All native reptile species in the UK are subject to partial protection from intentional or reckless killing or injury only.

A.3.2.2 The Protection of Badgers Act 1992

Badger and their setts are protected under the Protection of Badgers Act 1992 which makes it an offence to kill, injure or take a badger, or interfere with a sett.

A.3.3 Other Legislation Relating to Species

Public authorities listed in the Environment (Wales) Act 2016, including LPAs "*must seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in doing so promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions*".

Ecosystem resilience is defined as the capacity for ecosystems to adapt, and comprises the key characteristics:

- Diversity between and within ecosystems;
- The connections between and within ecosystems;
- The scale of ecosystems; and
- The condition of ecosystems (including their structure and functioning).

In complying with the Biodiversity and Resilience of Ecosystems Duty, it is necessary to have regard to:

- The list published under Section 7;

- The State of Natural Resources Report (SoNARR) published under Section 8[41]; and
- Any area statement published under Section 11 for an area that includes all or part of an area in relation to which the authority exercises functions.

Section 7 lists species and habitats which are 'of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales' (as decided by WG in consultation with Natural Resources Wales (NRW)).

Locally Protected Species which may be identified within County Local Biodiversity Action Plans (LBAP), the Royal Society for the Protection of Birds (RSPB) 'Birds of Conservation Concern' or Red Data books for example.

A.3.4 Invasive Non-Native Species

Schedule 9 of the Wildlife & Countryside Act 1981 (as amended) lists certain plants and animals that are not native to Great Britain and could pose a threat to our native species and habitats.

Under this legislation it is an offence to plant or otherwise causes to grow in the wild any plant which is included in Part II of Schedule 9. It is also an offence to sell or to release into the wild any plants or animals on the Schedule.

The Invasive Alien Species (Enforcement and Permitting) Order 2019 allows for the enforcement of the EU Invasive Alien Species Regulation 1143/2014 on the prevention and management of invasive alien plant and animal species in England and Wales, including the relevant licenses, permits and rules for keeping invasive alien species. Species on this list are no longer listed on Schedule 9 of the Wildlife & Countryside Act 1981 (as amended).

People undertaking works in proximity to invasive non-native plant species should take all reasonable steps and exercise all due diligence to avoid committing an offence.

A.4 Hedgerow Regulations 1997

The Hedgerow Regulations 1997 set out a framework for the protection of hedgerows against removal where they are deemed to be important either due to their age, ecological or archaeological features. Approval is required from the local authority prior to the removal of hedgerows deemed Important under the Hedgerows Regulations.

A.5 The well-being of Future Generations Act 2015

The Well-being of Future Generations Act 2015[42] places a duty on public bodies to carry out sustainable development. In this Act "sustainable development" means the process of improving the economic, social, environmental and cultural well-being of Wales by taking action, in accordance with the sustainable development principle, aimed at achieving the well-being goals.

The action a public body takes in carrying out sustainable development must include:

[41] https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en

[42] Acts of the National Assembly for Wales. The Well-being of Future Generations (Wales) Act 2015. https://www.legislation.gov.uk/anaw/2015/2/contents/enacted [last accessed 27/04/2022].

(a) setting and publishing objectives ("well-being objectives") that are designed to maximise its contribution to achieving each of the well-being goals, and

(b) taking all reasonable steps (in exercising its functions) to meet those objectives.

The seven well-being goals include: a resilient Wales, a prosperous Wales, a healthier Wales, a more equal Wales, more cohesive communities, a Wales of vibrant culture and thriving Welsh language and a globally responsible Wales.

Of most relevance is 'A resilient Wales', which seeks to maintain and enhance a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).

A.6 Planning Policy

A.6.1 Planning Policy Wales (PPW)

At national level, Planning Policy Wales[43] sets the national policies in relation to development control through the Town and Country Planning Act 1990. This is supported by a series of Technical Advice Notes, with Technical Advice Note (TAN) 5[44] being of particular relevance as it sets out the consideration of nature conservation in the determination of planning applications. This policy and TAN 5 require Local Authorities to take measures to:

- Promote the conservation of landscape and biodiversity, in particular the conservation of native wildlife and habitats;
- Ensure that action in Wales contributes to meeting international responsibilities and obligations for the natural environment;
- Ensure that statutorily designated sites are properly protected and managed;
- Safeguard protected species; and
- Promote the functions and benefits of soils, and in particular their function as a carbon store.

Developers must ensure that they comply with the above legislation by fully assessing the potential impacts on protected species and habitats from the proposed development. Where planning permission is required, this assessment must be finalised prior to and included with the submission of the planning application. The Planning Authority can then ensure that the necessary protected species and habitats information has been provided to inform an assessment and that proposals are in full accordance with relevant legislation and planning policy.

WG has produced a Nature Recovery Plan which is aimed at addressing the underlying causes of biodiversity loss by putting nature at the heart of its decision-making, by increasing the resilience of Wales' natural systems (ecosystems), and by taking specific action for habitats and species. It sets out how Wales will deliver the commitments of the EU Biodiversity Strategy and the UN Convention on Biological Diversity to halt the decline in our biodiversity by 2020 and then reverse that decline. The Nature Recovery Action Plan links to and complements The Well-being of Future Generations (Wales) Act 2015 and the Environment Act (Wales) 2016. Developments should seek to complement this, in order to meet objectives, set out in the Environment Act and Well-being Act.

Statutorily designated sites must be protected from damage and deterioration, with their important features conserved and enhanced by appropriate management.

[43] Welsh Government Planning Policy Wales Edition 11. February 2021. Planning Policy Wales - Edition 11 (gov.wales)

[44] Welsh Assembly Government (2009) Technical Advice Note 5: Nature Conservation and Planning.

Although non-statutory designations carry less weight than statutory designations, they can make a vital contribution to delivering an ecological network for biodiversity and resilient ecosystems, and they should be given adequate protection in development plans and the development management process.

Planning authorities must follow a step-wise approach to maintain and enhance biodiversity and build resilient ecological networks by ensuring that any adverse environmental effects are firstly avoided, then minimized, mitigated, and as a last resort compensated for; enhancement must be secured wherever possible

The presence of a species protected under European or UK legislation, or under Section 7 of the Environment (Wales) Act 2016 is a material consideration when a planning authority is considering a development proposal which, if carried out, would be likely to result in disturbance or harm to the species or its habitat and to ensure that the range and population of the species is sustained.

Planning authorities should protect trees, hedgerows, groups of trees and areas of woodland where they have ecological value, contribute to the character or amenity of a particular locality, or perform a beneficial and identified green infrastructure function. Planning authorities should consider the importance of native woodland and valued trees, and should have regard, where appropriate, to local authority tree strategies or SPG. Permanent removal of woodland should only be permitted where it would achieve significant and clearly defined public benefits. Where woodland or trees are removed as part of a proposed scheme, developers will be expected to provide compensatory planting.

Ancient woodland and semi-natural woodlands and individual ancient, veteran and heritage trees are irreplaceable natural resources, and have significant landscape, biodiversity and cultural value. Such trees and woodlands should be afforded protection from development which would result in their loss or deterioration unless there are significant and clearly defined public benefits; this protection should prevent potentially damaging operations and their unnecessary loss. In the case of a site recorded on the Ancient Woodland Inventory, authorities should consider the advice of NRW.

Nature based solutions should be the first consideration given the opportunity to deliver other multiple benefits, including habitat creation, biodiversity enhancement and water quality improvements. Overall, green infrastructure opportunities can benefit ecosystem resilience and provide opportunities for leisure facilities or renewable energy generation.

Appendix B

Anglesey and Gwynedd Joint LDP – Local Planning Policies[45]

[45] https://www.gwynedd.llyw.cymru/en/Council/Documents---Council/Strategies-and-policies/Environment-and-planning/Planning-policy/Anglesey-and-Gwynedd-Joint-Local-Development-Plan-Written-Statement.pdf

B.1 Conserving and enhancing the natural environment

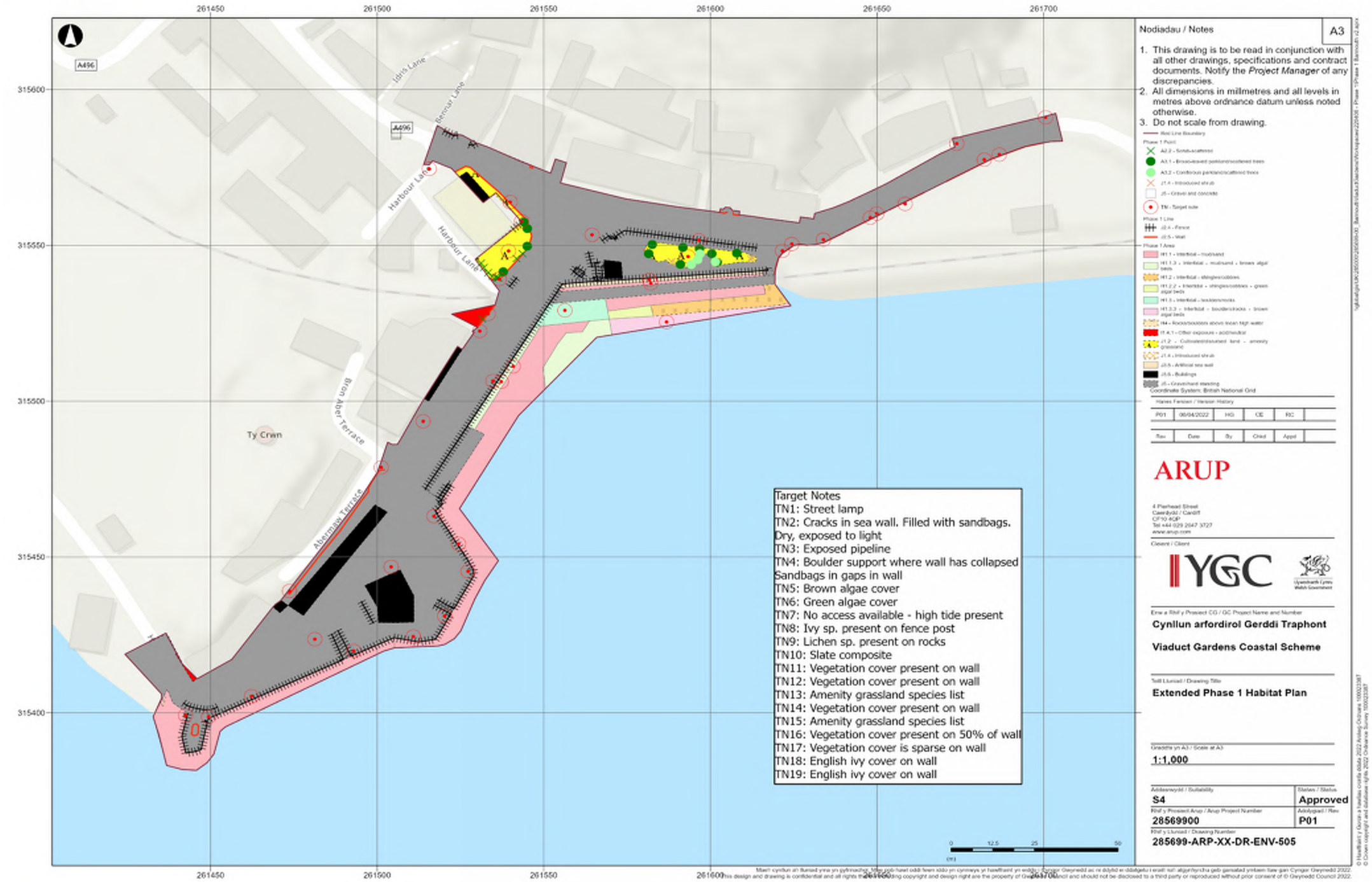
Local Planning Policy	Summary
Strategic Policy PS 19: Conserving and where appropriate enhancing the natural environment	The Councils will manage development so as to conserve and where appropriate enhance the Plan area's distinctive natural environment, countryside and coastline, and proposals that have a significant adverse effect on them will be refused unless the need for and benefits of the development in that location clearly outweighs the value of the site or area and national policy protection for that site and area in question. When determining a planning application, consideration will need to be given to the following:- 1. Safeguard the Plan area's habitats and species, geology, history, the coastline and landscapes; 2. Protect or where appropriate enhance sites of international, national, regional and local importance and, where appropriate, their settings in line with National Policy; 3. Have appropriate regard to the relative significance of international, national or local designations in considering the weight to be attached to acknowledged interests, ensuring that any international or national responsibilities and obligations are fully met in accordance with National Policy; 4. Protect or enhance biodiversity within the Plan area and enhance and/or restore networks of natural habitats in accordance with the Local Biodiversity Action Plans and Policy AMG5; 5. Protect or enhance biodiversity through networks of green/ blue infrastructure; 6. Safeguard internationally, nationally and locally protected species; 7. Protect, retain or enhance the local character and distinctiveness of the individual Landscape Character Areas (in line with Policy AMG 2) and Seascape Character Areas (in line with Policy AMG 4); and 8. Protect, retain or enhance trees, hedgerows or woodland of visual, ecological, historic cultural or amenity value.
Policy AMG 1: Area of Outstanding Natural Beauty management plans	Proposals within or affecting the setting and/ or significant views into and out of the Areas of Outstanding Natural Beauty must, where appropriate, have regard to the relevant Area of Outstanding Natural Beauty Management Plan.
Policy AMG 2: Special landscape areas	When considering a proposal within Special Landscape Areas (SLA), as identified by the Proposals Map and listed below, there will be a need to appropriate consideration to the scale and nature of the development ensuring that there is no significant adverse detrimental impact on the landscape. The development should aim to maintain, enhance or restore the recognised character and qualities of the SLA. The proposal should have regard to the relevant 'Statement of Value and Significance'. Where appropriate, the Councils will require a Landscape and Visual Impact Assessment in order to consider the impact of the development on the designated area. In exceptional circumstances, where development is necessary and could result in significant impact on the landscape, appropriate mitigation and compensation measures should be provided.
Policy AMG 3: Protecting and enhancing features and qualities that are distinctive to the local landscape character	Proposals that would have significant adverse impact upon landscape character as defined by the Landscape Character Areas included within the current Landscape Strategy for the relevant authority, must demonstrate through a landscape assessment how landscape character has influenced the design, scale, nature and site selection of the development. A proposal will be granted provided it doesn't have significant adverse impact upon features and qualities which are unique to the local landscape in terms of visual, historic, geological, ecological or cultural aspects. Measures should be taken to ensure that the development does not: 1. Cause significant adverse impact to the character of the built or natural landscape; 2. Fail to harmonise with, or enhance the landform and landscape; and 3. Lose or fails to incorporate traditional features, patterns, structures and layout of settlements and landscape of both the built and natural environment.

Local Planning Policy	Summary
	Particular emphasis will be given to the landscapes identified by the Landscape Character Areas as being of high and outstanding quality because of a certain landscape quality or a combination of qualities. Additional consideration will also be given to development that directly affect the landscape character and setting of the AONBs or the National Park.
Policy AMG 4: Coastal protection	In considering a proposal on the coast, including the Heritage Coast, there will be a need to ensure that the proposal conforms to the following criteria:- 1. The development due to its nature must be located on the coast, or in open estuaries, or nearby, and that there is an overriding economic and social benefit from the development; 2. It does not cause unacceptable harm to: i) water quality; ii) public access considerations; iii) the built environment, or the landscape, or seascape character; and/ or iv) the area's biodiversity interests (including European Protected Areas such as marine Special Areas of Conservation and Special Protected Areas) due to their location, scale, form, appearance, materials, noise, or emissions or due to an unacceptable increase in traffic; 3. Priority is given to locations with a close visual connection to current buildings or existing structures; 4. There are no suitable alternative locations on the coast that have been developed; and 5. That the development is consistent with other policies within the Plan including Policy ARNA1.
Policy AMG 5: Local biodiversity conservation	Proposals must protect and, where appropriate, enhance biodiversity that has been identified as being important to the local area by: a) avoiding significant harmful impacts through the sensitive location of development; and b) considering opportunities to create, improve and manage wildlife habitats and natural landscape including wildlife corridors, stepping stones, trees, hedges, woodlands and watercourses. A proposal affecting sites of local biodiversity importance will be refused unless they can conform with all of the following criteria:- 1. That there are no other satisfactory alternative sites available for the development; 2. The need for the development outweighs the importance of the site for local nature conservation; and 3. That appropriate mitigation or compensation measures are included as part of the proposal. Where necessary, an Ecological Assessment which highlights the relevant local biodiversity issues should be included with the planning application.
Policy AMG 6: Protecting sites of regional or local significance	Proposals that are likely to cause direct or indirect significant harm to Local Nature Reserves (LNR), Local Wildlife Sites, or regionally important geological/ geomorphologic sites (RIGS) will be refused, unless it can be proven that there is an overriding social, environmental and/or economic need for the development, and that there is no other suitable site that would avoid having a detrimental impact on sites of local nature conservation value or local geological importance. When a development is granted, it will be necessary to ensure that there are appropriate mitigation measures in place. It will be possible to use planning conditions and/or obligations in order to safeguard the site's biodiversity and geological importance.

Appendix C

Extended Phase 1 Habitat Survey Results

C.1 Extended Phase 1 Habitat Survey Results



Mae'r cynllun a'r lluniad yma yn gyfrinachol. Mae pob hawl oddi fewn iddo yn cynnwys yr hawlfraint yn eiddo i Cyngor Gwynedd ac ni ddylid ei ddatgelu i unrhyw drydydd parti gelb gamsatad ymlaen llaw gan Cyngor Gwynedd 2022.
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Appendix D

Intertidal Biotope Report

ARUP

Ymgynghoriaeth Gwynedd Consultancy (YGC)

Barmouth Viaduct Gardens

Intertidal Biotope Report

Reference: 285699-ARP-XX-RP-ENV-006

Rev- CO1 | 07 July 2023



This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 285699

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Contents

1.	**Introduction**	**1**
2.	**Project Background**	**1**
3.	**Project Description**	**1**
3.1	Scheme development	1
3.2	Detailed design	2
3.3	Construction methodology	3
4.	**Methodology**	**4**
4.1	Intertidal Biotope Survey	4
4.2	Limitations	4
5.	**Results**	**5**
5.1	Marine Desk Study	5
5.2	Priority Habitats	5
5.3	Intertidal Biotope Survey	5
6.	**Impact Assessment**	**8**
6.1	Direct Effects	8
6.2	Indirect Effects	8
7.	**Preliminary Mitigation**	**9**
7.1	Direct Effects	9
7.2	Indirect Effects	9
7.3	Enhancement Opportunities	10

Figures

Figure 1. Study Area 2

Figure 2. Examples of water retaining features in rock armour. 11

Figure 3: Top Left: Frontage 1 seawall; view north. Top right; Frontage 1 seawall and rock armour; view north. Bottom Left: Frontage 1 intertidal area, view south. Bottom right: Frontage 1 intertidal area, view south. 13

Figure 4: Top left; Frontage 2 wall between frontage 1 and quay, view northwest. Top right: Closer view of Frontage 2 wall between frontage 1 and quay, view northwest. Bottom left: rock pool type habitat created by sheet piling. Bottom right, rock pool type habitat created by sheet piling. 14

Figure 5: Various points of frontage 2 wall, south of the Quay. 15

Appendices

Appendix A- Intertidal Biotope Survey Photos 12
Appendix B- Proposed Site Layout 16
Appendix C- Proposed Seawall Details-typical Section 17
Appendix D- Proposed Drainage Sections- New Outfall 18
Appendix E- Construction Methodology 19
Appendix F- Environmental Constraints Plans 20

1. Introduction

Ymgynghoriaeth Gwynedd Consultancy (YGC) commissioned Ove Arup and Partners Limited (Arup) to undertake an Intertidal Biotope Survey as part of the Barmouth Viaduct Gardens Flood Alleviation Scheme.

The proposed works are located along the seawall and intertidal area to the south of Viaduct Gardens, Barmouth. The survey will identify the principal habitats and key species, likely environmental constraints and initial recommendations for mitigation measures that may need to be taken into account in the development of the preferred solution(s) and potential opportunities for enhancement.

The Intertidal Biotope Survey was undertaken on the 29 March 2022 to target lower tides enabling survey of a greater extent of eulittoral (lower shore) habitats; low water was at 14:25 BST, with a low water level of 0.92m above Chart Datum. Marine Habitat (Biotope) photos are provided in Appendix A. The purpose of this report is to provide baseline information on intertidal habitats to inform the detailed design stage of the project.

This report has been updated since first issue to incorporate an appraisal of impacts of the detailed design and identification of mitigation/enhancement measures.

2. Project Background

Ymgynghoriaeth Gwynedd Consultancy (YGC), part of Cyngor Gwynedd Council, appointed Ove Arup and Partners (Arup) to undertake the detailed design of the Barmouth Viaduct Gardens Flood Scheme in January 2022.

Barmouth (Abermaw) in Gwynedd, Wales is located on the northern shore on the mouth of the Mawddach Estuary. The sea front at Barmouth suffers from flooding due to both overtopping of the sea wall and surface run-off from the bluff behind the town (Dinas Oleu). A Project Appraisal Report (PAR) was originally undertaken in 2004. This was updated in 2018 and formed the basis of an Outline Business Case (OBC) approved in June 2021. The OBC presented nine options for coastal flood risk management along the sea front of which Option 8 was preferred. Option 8 includes a raised sea wall with new access gates, repair to the existing sea wall, a new 450mm diameter culvert in Church Street with gullies, new pumping station and outfall to upgrade the existing highway drainage.

The objectives of this project are to:

1. Reduce the risk of coastal flooding to properties at the Viaduct Gardens frontage, Barmouth.
2. Maintain existing landscape character of the area whilst enhancing sea defences.
3. Reduce flood risk to the A496 county road.
4. Enhance sea defences without causing damage / harm to the natural environment.
5. Maintain the Cambrian Coast Railway.

3. Project Description

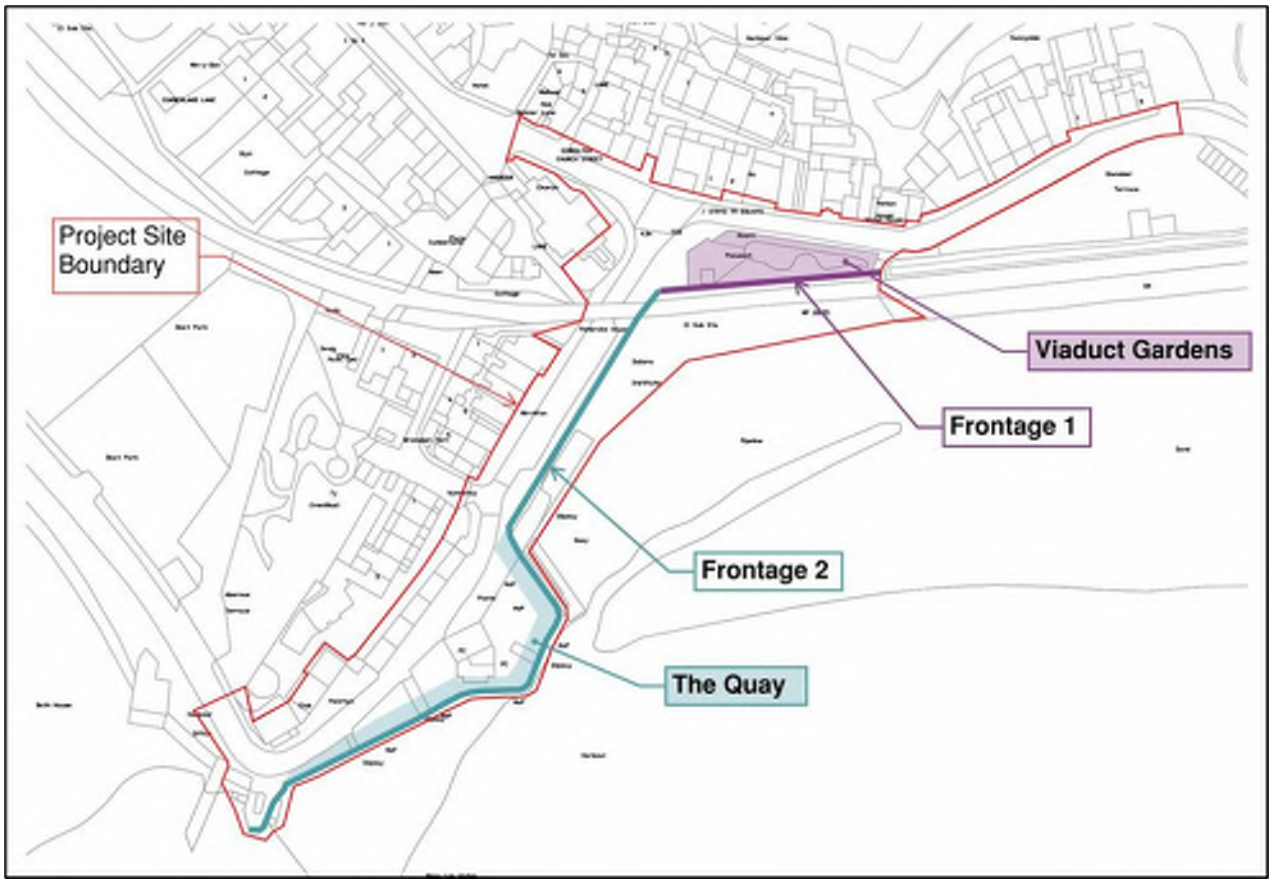
3.1 Scheme development

Arup's commission is to develop the preferred Option 8 into full detailed design including construction specification, drawings, planning application and pre-construction information.

A plan of the site location including the study area is provided in Figure 1. The preferred Option 8 covers two distinct stretches of sea front at Barmouth. For the purposes of this Project, these are referred to as Frontage 1 and Frontage 2 as shown in Figure 1. Since the OBC was approved, the proposed approach along Frontage 2 has been reviewed. Concerns over the feasibility and viability of constructing a permanent set-back flood wall parapet have led to an emerging option of property level protection approach to minimise

changes to the public infrastructure of the sea front. While YGC explore this option, Arup's commission in Frontage 2 is limited to including it within project investigations. The main focus of the study and design is therefore Frontage 1 and the area immediately behind Viaduct Gardens.

Figure 1. Study Area



The Viaduct Gardens area is located near St David's Church at the south end of the town and consists of a pedestrianised public space which is bounded landward by the A496 (Porkington Terrace) and Church Street. On the seaward side is a slightly raised parapet seawall which runs along the harbour area and is just behind the railway viaduct near where it makes landfall. In addition to the railway line and roads there is significant infrastructure at this location in the form of a Dŵr Cymru Welsh Water (DCWW) combined pump and combined sewer overflow (CSO), and an electricity substation.

The baseline data presented within this report will inform potential intertidal biodiversity constraints and opportunities associated with the proposed works. This particularly contributes to objective 4 of this project; to enhance sea defences without causing damage / harm to the natural environment and support Gwynedd Council duties under Section 6 of the Environment (Wales) Act 2016 to conserve and enhance biodiversity throughout their functions.

3.2 Detailed design

Detail design has focused only on frontage 1 (see figure 1). Works include:

- Existing seawall to be rebuilt with precast concrete units, faced with stone masonry cut from stones in existing seawall.
- New raised section of seawall immediately behind rebuilt seawall, with stone block masonry finish.
- Existing 'temporary' rock armour to be redistributed across front of seawall with additional smaller stones incorporated as required.
- New surface water outfall on beach further out than existing viaduct.
- Existing outfall and pipe onto beach to be removed.

- Single leaf flood gate.
- Control box for new underground pumping station and new chambers (arrangement tbc).
- New setback wall at rear of garden with stone block masonry finish.
- New gulleys and chambers to increase highway drainage capacity at low point (arrangement tbc).
- Double leaf flood gate.
- Existing paviors replaced with raised pedestrian crossing (blending).
- Double leaf flood gate.
- Existing stub wall and railings removed.
- Paved area incorporated into Viaduct Gardens
- New railings creating new perimeter to viaduct gardens.
- New raised section of seawall tapers down from 5.60 in corner to ground under viaduct.

Refer to the following drawings for more information:

Appendix B- 285699-ARP-XX-DR-GEN-150- proposed site layout.
Appendix C- 285699-ARP-XX-DR-STR-360- proposed seawall details- typical section
Appendix D- 285699-ARP-XX-DR-CIV-290- proposed drainage sections- new outfall

3.3 Construction methodology

Construction methodology is detailed in Appendix E. A summary of the construction methodology particularly relevant to the intertidal habitats on site is provided below:

Works to the wall

- Access – access to seaward side via ramp 50m away. Plant (tracked excavator and tracked dumpster) will return to top of the ramp storage area at end of each shift. The majority of the works will be carried out from the viaduct gardens site to avoid marine working.
- Temporary works- sheet piling or king post walls will be used to support the embankment, mainly installed from the viaduct gardens side. Current wall and beach rock armour will remain in place during installation of temporary works. Existing surface water drainage outfalls will be maintained as active throughout the works until it is swapped over to the permanent works.
- Existing wall demolition/removal- Existing wall will be demolished in sections with exposed wall dependant of extent of temporary works protection to the embankment. Existing rock armour at the toe of the wall will be moved back form the wall to expose the face.
- Wall foundations- Concrete (poured by skip or pump from viaduct gardens side) pour will be done early in shift to allow curing before next tide, with time times and heights monitored for the activity.
- Precast wall- PCC units will be laid directly on the base in situ slab once cured. With the PCC unit anchored into the base slab using grouted in dowels. PCC unit will be craned in by an excavator, either form the top of the embankment or from the bottom , dependant on working space around existing structures. Backfill for middle wall will be done form the gardens side of the wall with placement and compaction carried out in thin layers. Upper part of wall and where new and existing outfalls will be cast in situ.
- Cast in situ sections- Concrete pours for the will be done using pump or skip for the top of the wall.
- Insitu parapet wall- Access to the parapet will be mainly form the garden, with scaffold used on the seaward side.

- Rock armour- Previously removed armour stored at beach level will be placed by excavator on the geotextile laid against the new wall . Additional armour will be delivered to the harbour side by road wagon and transferred to temporary stockpile.

Works to the outfall

- Temporary works- Existing piped outfall will remain operational until new system is complete, and rock armour excavated from the wall works may be used to protect the new piped outfall area.
- Pipe work installation- Timing of the works will be to coincide with good weather and low tides (excavation work may go as low as approximately -0.5 AOD). Material will be brought in by a dumper across the beach. Placement of the concrete mattress will be done when tides and weather conditions are favourable, with accelerators considered to be used to ensure the concrete cures before next tide.
- Concrete surround- Shutters will be placed either side of the pipe and anchored to the concrete mattress. Concrete will either be pumped to works area or brough in with dumper and place with excavator. Shutters will be removed once concrete is cured and take off site.
- Outfall detail- Rock armour will be paced in the end by excavator with material brough in by dumper along the beach. Once complete any rock armour used as temporary protection will be removed and taken back to the wall as permanent works. Beach levels will be restored round the new pipe and ant debris form the works cleared away.

4. Methodology

4.1 Intertidal Biotope Survey

An Intertidal Biotope Survey was undertaken along the shore parallel with the proposed works by two experienced marine ecologists on 29 March 2022 within the study area delineated in Figure 1.

The survey was undertaken in accordance with the JNCC's Marine Nature Conservation Review (MNCR) Intermediate Level survey for rapid biotope assessment comprising broad biotope appraisal and identification of conspicuous flora and fauna. The survey was timed to target low water to maximise the extent of accessible intertidal habitat. The Intertidal Biotope Survey was undertaken either side of low water, which occurred at 14:25 BST at a tidal height of 0.92m Above Chart Datum.

The survey was undertaken in accordance with the JNCC's MNCR methodology, which was developed to provide a comprehensive baseline of information on marine habitats and species, to aid coastal zone and marine management and to contribute to the identification of areas of marine natural heritage importance throughout Great Britain. MNCR focusses on benthic habitats and their associated communities, which together are described as 'biotopes' in inshore areas. The MNCR developed methods for survey, assessment and recording to enable systematic and consistent descriptions of the character of habitats present and the abundance of species in them so that comparisons between sites could be undertaken. The MNCR survey methodology was employed for the intertidal survey.

In accordance with MNCR guidance an intermediate-level survey was considered appropriate to describe baseline conditions. This enabled a rapid assessment of habitats and conspicuous fauna, between Mean High Water Springs (MHWS) and Mean Low Water Springs (MLWS), in addition to physical characteristics of the site and potential modifiers. Core sampling, sieving and sediment size analysis was not considered necessary to inform this baseline assessment. Abundances are described according to the MNCR SACFOR scale, which in summary is as follows: Superabundant (>80%), Abundant (40-79%), Common (20-39%), Frequent (10-19%), Occasional (5-9%), Rare (1-5%) and Present (<1%)

4.2 Limitations

The survey was undertaken on the 29 March 2022. The recommended months for intertidal surveys are April to October; the survey was required to be completed just outside of this recommended window due to logistical constraints. The advisory survey period typically permits suitable daylight hours around spring

tides, better weather and greater floristic density and diversity. At the time of survey, the weather was warm (14°C) and overcast and thus considered appropriate and robust. The survey was timed to take advantage of low tides (0.92m) with the biotopes in the vicinity of MLWS assessed at low tide (14:25 BST). Access to the full extent of the eulittoral to MLWS was not possible due to the tidal state; however, the majority of habitats were accessible at the time of survey. It is therefore considered that the biotopes and species identified are representative.

5. Results

5.1 Marine Desk Study

The Study Area is recorded as Water Framework Directive (WFD) Lower Sensitivity Habitats:

- Rocky shore (Intertidal rock – EUNIS Habitat Code: A1).
- Intertidal Soft Sediment (Sand, Mud & Mixed A2.2, A2.3, A2.4).

WFD Higher sensitivity habitat, Mussel Beds (*Modiolus modiolus*, *Mytilus edulis* & others) (A1.22, A2.72, A5.62, A4.24, A3.361) is present approximately 100m east and 400m southwest of study area. WFD Higher sensitivity habitat, Saltmarsh (A2.5) is present approximately 500m south of the study area. No further higher sensitivity WFD habitats are recorded on the MAGIC website.

The MAGIC website does not have any records for Shellfish Areas or Classified Bivalve Mollusc Harvesting Areas in the immediate area of the proposed works.

Llé Map viewer shows records of the following habitats listed under Environment (Wales) Act Section 7 and OSPAR: Marine Habitats - Section 7:

- Estuarine rock 100m west of the study area.
- Blue Mussel Beds 100m west of the study area.
- Intertidal mudflats 400m west of the study area.

5.2 Priority Habitats

No Priority Habitats listed under Section 7 of the Environment (Wales) Act (2016) were identified to be present within the site during the survey.

5.3 Intertidal Biotope Survey

5.3.1 Overview of the Study Area

The study area of this intertidal biotope survey consists of the intertidal area immediately seawards of the seawalls along Frontage 1 and Frontage 2 from MHWS to MLWS, see Figure 1.

5.3.2 Frontage 1

For the purpose of this report the intertidal area of Frontage 1 consists of the area directly seawards of the Viaduct Gardens public space and seawall. The area is characterised by the slate stone seawall, which has been reinforced with concrete and stone, with rock armour placed in front of the wall (central and western sections) to provide erosion protection (see Appendix A, Figure 3, photos A and B). Concrete piers supporting the above railway line run along this area, following the same alignment as Frontage 1.

The characteristics of the habitat here resemble predominant areas of intertidal bare sand with patchy areas of shingle and cobbles. The rock armour and viaduct pillars have been colonised by sparse lichen and patches of green alga. Lower down on the shore, small intertidal rocks and boulders are present, colonised by brown and green algae (see Appendix A, Figure 3, Photos C and D).

A relatively broad range of commonly occurring species were observed; including the following, SACFOR abundance denoted as [#]:

- Algae - Chlorophyta (green seaweeds): *Ulva enteromorpha* [O] (gutweed).
- Algae - Ochrophyta: Phaeophyceae (brown seaweeds): *Fucus spiralis* [C] (spiral wrack), *Pelvetia canaliculata* [C] (channelled wrack), *Fucus vesiculosus* (bladderwrack) [C], *Fucus ceranoides* (horned wrack) [O], *Ascophyllum nodosum* [O] (knotted wrack).
- Crustacea - *Semibalanus balanus* [A] (acorn barnacle), *Austrominius modestus* [R] (Darwin's barnacle – Invasive Non-Native Species).
- Chordata: Pisces: Osteichthyes (fish) – *Lipophrys pholis* [P] (shanny), *Pholis gunnellus* [P] (butterfish).
- Mollusca - *Littorina littorea* [C] (common periwinkle).

5.3.3 Frontage 2

For the purpose of this report the intertidal area of Frontage 2 consists of:

- The section in-between Frontage 1 and the Quay (see figure 1) characterised by a seawall and north-facing slipway, with sheet piles installed at the toe of the wall at the northern end (See photos E and F - Appendix A). It was observed that sheet piling along this wall created water retaining features (artificial rockpools), increasing species abundance in these areas (See Appendix A, Figure 4, photos G and H).
- The section in front of the Quay (see Figure 1), characterised by slate stone walls, colonised by common algae species (see list below) and sand.
- Intertidal sand is the predominant habitat within frontage 2. This habitat is adjacent to the seawall and extends from the north-facing slipway southwards to the south-facing slipway (See Appendix A, Figure 5, photos I, J, K and L). The tide within certain areas of the southern aspect of the Site was above the substrate level, therefore was surveyed from above the seawall, looking through the depth of the tide at the substrate below.

A relatively broad range of commonly occurring species were observed; including the following, SACFOR abundance denoted as [#]:

- Algae – Chlorophyta (green seaweeds): *Ulva enteromorpha* [C] (gutweed).
- Algae – Ochrophyta: Phaeophyceae (brown seaweeds): *Fucus vesiculosus* [F] (bladder wrack), *Fucus spiralis* [O] (spiral wrack), *Ascophyllum nodosum* [A] (knotted wrack).
- Algae – Rhodophyta (red seaweeds): *Chondrus crispus* (carrageen) [O], *Polysiphonia lanosa* (epiphytic), *indet. filamentous sp*. [*O*], *Rhodothamniella floridula* (sand-binding filamentous red algae) [O].
- Cnidaria – *Actinia equina* [R] (beadlet anemone).
- Crustacea - *Ligia oceanica* [O] (common sea slater), *Carcinus maenas* [O] (common shore crab), *Palaemon* sp. (prawn) [O], *Semibalanus balanus* [A] (acorn barnacle), *Austrominius modestus* [O] (Darwin's barnacle – Invasive Non-Native Species).
- Mollusca - *Littorina littorea* [C] (common periwinkle), *Littorina saxatilis* [F] (rough periwinkle) *Littorina obtusata* [C] (flat periwinkle), *Melarhaphe neritoides* [O] (Small periwinkle), *Steromphala (Gibbula) umbilicalis* [F] (flat top shell), *Steromphala cineraria* [O] (grey top shell), *Patella depressa* [C] (blackfooted limpet), *Patella vulgata* [C] (common limpet), *Mytilus edulis* [R] (common mussel), *Cerastoderma edule* [R] common cockle.
- Porifera: *Porifera sp*.[O] (orange sponge).

5.3.4 Intertidal Biotopes

Species zonation, distribution and abundance varied throughout the Study Area. The key biotopes have been identified in Table 1 below. Only one incident of marine INNS, *Austrominius modestus* (Darwin's barnacle) (Grid Ref: 52.719626, -4.0506721), was recorded during the survey.

Incidental observations included several stranded *Cyanea lamarkii* (blue jellyfish) and one individual of *Liocarcinus marmoreus* (marbled swimming crab). Evidence of *Scrobicularia plana* feeding (star-patterns in sediment) observed on eulittoral sand, in addition to bird feeding remains of *S. plana*, *Cerastoderma edule* (edible cockle) [O] and *Macoma balthica* (Baltic tellin) shells and casts of *Lanice conchilega* (sand mason worm) [O] and *Arenicola marina* (lugworm) [C]. Two cormorants (*Phalacrocorax carbo*), two oystercatchers (*Haematopus ostralegus*), two terns (*Sterna* sp.) and c. 30 herring gull (*Larus argentatus*) were also observed foraging and resting across the estuary.

Also of note is that most species were large mature specimens (notably *Patella vulgata* and *Ligia oceanica*) suggesting a healthy habitat. A sign is present on the harbour warning residents and visitors of potential *Echiichthys vipera* (lesser weever fish) presence in the area. The spines of the first dorsal fin and gill covers release a poison that give an extremely painful sting to bathers or fishermen treading on or handling the buried fish.

Table 1: Intertidal Biotopes Recorded

Zonation	Biotope Code	Biotope	Locality
Supralittoral Fringe	LR.FLR.Lic.YG	Yellow and grey lichens on supralittoral rock	Frontage 1 seawall, rock armour and viaduct pillars
Supralittoral Fringe	LS.LCS.Sh	Shingle (pebble) and gravel shores	Frontage 1 area beneath viaduct
Upper Littoral Fringe	LS.LCS.Sh.BarSh	Barren littoral shingle	Frontage 1 area beneath viaduct
Lower Littoral Fringe	LS.LSa.Mo.Sa.BarSa	Barren Littoral Coarse Sand	Sandy areas throughout Frontage 1 Sandy areas throughout Frontage 2 adjacent to seawalls
Lower Littoral Fringe	LR.MLR.BF.PelB	*Pelvetia canaliculata* and barnacles on moderately exposed littoral fringe rock	Frontage 1 area beneath viaduct Frontage 2 seawall
Upper- / Mid-Eulittoral	LR.LLR.F.Asc.X	*Ascophyllum nodosum* on full salinity mid eulittoral mixed substrata	Frontage 1 rocky shore southwards of viaduct Frontage 2 seawall
Mid-Eulittoral	LR.LLR.F.Fspi	*Fucus spiralis* on moderately exposed to very sheltered upper eulittoral rock	Frontage 1 rocky shore southwards of viaduct
Mid-Eulittoral	LR.LLR.F.Fves.X	*Fucus vesiculosus* on mid-eulittoral mixed substrata	Frontage 2 seawall
Mid-Eulittoral	LR.HLR.MusB.Sem.FvesR	*Semibalanus balanoides*, *Fucus vesiculosus* and red seaweeds on exposed to moderately exposed eulittoral rock	Frontage 2 seawall

Seawards of the Frontage 1 and 2 study areas the habitat is predominantly characterised by areas of sand and muddy sand.

6. Impact Assessment

The following sections have focused on frontage 1, and the intertidal area outlined within the redline within the environmental constraints plan (Appendix F).

Overall , risk to intertidal species and habitats is low. Broadly, the marine habitats and species present are commonly occurring and of lower importance; regardless, measures should be adopted to avoid direct and indirect effects, e.g. pollution incidents, on all intertidal habitats throughout the development area. The works are immediately adjacent to and within the intertidal 'mudflats and sandflats' feature of the Pen Llyn a'r Sarnau Special Area of Conservation (SAC). The area is also part of the 'Estuaries' feature of the SAC. SAC features are addressed in the associated Habitats Regulations Assessment (HRA).

6.1 Direct Effects

No priority species or habitats were observed during the baseline survey; however, distribution of such species can change markedly from year to year resulting from natural and / or anthropogenic impacts. Habitat loss is highly likely to occur, Sensitive consideration to intertidal features has been undertaken during detailed design and integration of mitigation and enhancement measures (*inter alia*) to adhere to Environment (Wales) Act 2016 Section 6 duties (see Section 7).

Permanent habitat loss will occur from construction of the new outfall. No priority species or habitats will be affected by the proposed outfall footprint. However, commonly occurring species including brown algae, crustaceans, and molluscs, will be permanently affected by the new outfall. An estimated 84m sq of intertidal habitat (sand, shingle and cobbles) would be permanently lost to the outfall, replaced with the hard substrate of the outfall casing and scour protection.

Although no priority habitats/species were found, it was apparent that the rock armour and viaduct pillar provide suitable attachment material for lichen and green algae (lower value and common species). Relocation of the rock armour may cause temporary disturbance to this habitat and potential smothering should colonised rock armour be placed at a different orientation on the sediment, but quick recovery is anticipated. The areas of rocks and boulders lower down on the shore provide suitable attachment for brown and green algae, which may provide habitat for a variety of intertidal species such as crustaceans, fish and molluscs; however, this habitat will remain post-construction.

Temporary effects on intertidal mudflat / sandflats have potential to occur from tracking of plant over the beach from the ramp (slipway) access (approximately 50m southwest of the wall). Disturbance to sandflats and mudflats from construction traffic will be temporary and negligible, due to the sediment protecting the mobile infauna therein.

6.2 Indirect Effects

The risk of a pollution incident during construction will require mitigation and integration into the appointed Contractor's CEMP. Demolition of the seawall, excavation and concrete pouring activities have potential to contaminate and pollute the intertidal area. Similarly, measures will be required to minimise the tracking of vehicles or storage of materials on or near intertidal habitats. More sensitive habitats include the algae (seaweed) beds associated with the gravel / cobble habitats, whilst the intertidal sand habitats are deemed more resilient to temporary stresses.

Changes in coastal processes following works to the wall and construction of the new outfall are considered minimal due to the scale of the scheme and similarity with the existing situation.

7. Preliminary Mitigation

Preliminary mitigation measures were previously recommended pending confirmation of the preferred design solution. This section has since been reviewed and updated following the preferred design solution. Updated mitigation should be integrated into an Environmental Action Plan (EAP) or Outline CEMP as appropriate.

7.1 Direct Effects

No direct impacts to any priority habitats or priority species are anticipated. Recommendations to manage potential impacts shall be kept under review as the project progresses.

The development proposals at the site should seek to avoid impacts to habitats of ecological value where possible. Where avoidance of such habitat is not possible, their loss or damage should be minimised. Any loss of valuable habitat should be adequately mitigated through offsetting in order to comply with national and local planning policy, preferably reinstated on a like-for-like basis.

Mitigation measures may be required to avoid access to sections of the mid- to lower shore where trafficking of vehicles may directly impact sensitive marine habitats; tracking of vehicles over the intertidal area, in particular the areas of rock and boulders lower down on the shore, should be avoided wherever practicable.

7.2 Indirect Effects

Works in the vicinity of the estuary and intertidal zone shall adopt pollution prevention measures to avoid pollution incidents and minimise silt dispersed downstream. Integration of Guidance for Pollution Prevention (GPP[1]) into the contractors CEMP will be essential to avoid impacts on sensitive marine habitats.

Additional mitigation measures are proposed in the HRA for the Pen Llyn a'r Sarnau SAC as below:

- Materials stored on site shall be located more than 10m away from watercourses or estuary habitat at all times.
- Pollution spill kits to be readily available on site and in plant/machinery at all times, with staff suitably trained in how to deploy.
- Contractor to have emergency incident response procedure in place in the case of a spillage.
- Contractor to adhere to pollution prevention best practice guidelines, including PPG1: Understanding your environmental responsibilities, GGP5: Works and maintenance in or near water, PPG6: Working at construction and demolition sites, GPP21: Pollution response planning, GPP22: Dealing with spills.
- Biodegradable lubricant and hydraulic oil to be used in plant machinery where possible. Biodegradable oils are less toxic than most synthetic oil but should still be stored to the same standards as other oils and prevented from entering the water environment.
- Works to take place at low tide conditions only. No works to be completed within the intertidal area when the adjacent mudflat and sandflats are inundated with seawater.
- Any excess concrete material or wash-water shall be fully and securely contained and disposed of appropriately off site.
- All concreting works to take place at low tide conditions, allowing sufficient time for concrete to set prior to any potential tidal inundation. Curing accelerators to be used where necessary.
- Contractor to monitor tidal and weather conditions / forecasts and plan work accordingly.

WFD higher sensitivity habitats were identified in proximity to the works. Any water quality impacts on marine receptors will be managed via WFD requirements and the mitigation proposed above; principally GPP compliance. A Coastal Water Framework Directive (WFD) Compliance Assessment will be

[1] http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/

undertaken, and mitigation measures outlined to ensure the project does not lead to a deterioration in WFD status or prolong the attainment of targeted objectives.

Due to the present of a marine INNS at the site (*Austrominius modestus* – Darwins barnacle), there is a need to comply with biosecurity measures to avoid the transfer of INNS. Since works are proposed within the marine environment with known INNS, it is recommended that a Biosecurity Risk Assessment is prepared in advance to avoid the risk of introduction of marine INNS or transfer of known INNS to other sites.

7.3 Enhancement Opportunities

It is recommended that enhancement measures are considered for integration into the detailed design in accordance with Section 6 [Environment (Wales) Act 2016] duties to conserve and enhance. Clear biodiversity gains should be demonstrated to comply with Environment (Wales) Act Section 6 duties and marine planning policy requirements for enhancement.

Of particular relevance are ecoengineering enhancements. These can be incorporated into new build structures but also existing structures as part of remedial works or retrofitted, with the aim to enhance biodiversity of new and/or existing coastal structures. They can be applied to the entire scheme, to a discrete section, or to enhance a niche habitat. For example, microhabitats such as rockpools, crevices, holes, flexible canopies and textured surfaces can be created on structures to provide refuge habitats and enable them to function more like natural reefs. These can be drilled, cut or cast into structure surfaces, or 'bolted-on' in the form of prefabricated habitat units. Refer to NRW's Coastal Enhancements Toolkit [2] for more information (link in footnote below).

Key legislative drivers requiring the delivery of marine biodiversity enhancements include:

- Environment (Wales) Act 2016 – The Act sets a duty on Local Authorities to adopt Sustainable Management of Natural Resources (SMNR) in the exercise of their functions. Section 6 also enacts a duty to conserve and enhance biodiversity and promote the resilience of ecosystems, with a focus on Priority Habitats and Priority Species.
- National Strategy for Flood and Coastal Erosion Risk Management (FCERM) – encourages the use of natural flood management techniques through nature-based solutions, such as delivery of coastal ecoengineering enhancements.
- Welsh National Marine Plan – Policy ENV_01 aims to ensure that biological components of ecosystems are maintained, restored where needed and enhanced where possible, to increase the resilience of marine ecosystems and the benefits they provide.
- Natural Resources Policy – sets out three national priorities for the management of our natural resources. First and foremost is the requirement to deliver nature-based solutions, such as deployment of ecoengineering enhancements.
- Well-Being of Future Generations Act 2015 – the Act aims to improve the social, economic and cultural well-being of Wales by placing a duty on public bodies to think in a more sustainable and long-term way. The Act puts in place seven well-being goals that public bodies must work to achieve and take into consideration across all their decision-making.

The materials used in structures can also be selected to promote biodiversity. This could include using natural rock for rock armour, similar to local habitats, softer rock that may weather more readily, or lower-carbon concretes with recycled components that can reduce the environmental footprint of construction, while providing substrates with significantly more effective colonisation potential (*less alkaline surface – better colonisation*) than standard concrete. Ecoengineering may also help to support reduced flood risk through increasing erosion resilience, as well as improve the visual aesthetic and educational value of coastal defence structures for coastal users.

[2] https://cdn.cyfoethnaturiol.cymru/media/695259/guidance-to-support-the-use-of-ecological-enhancement-features-on-coastal-defence-structures-and-assets.pdf

Options for ecoengineering enhancements on the re-engineered seawall (Frontage 1) itself are limited due to heritage setting constraints and high position in the intertidal. However, the existing and new rock armour at the foot of the wall is suitable for enhancement in the form of creating artificial water retaining depressions or holes on the rocks. (Figure 2). The number of holes/depressions can be confirmed at a later date. These features would retain water at low tide, with the potential to support greater number of species compared to adjacent surfaces.

Rockpool units could also be installed at the lower elevations of rock armour deployment. These low-alkalinity concrete tidal pools retain water at low tide and improve biodiversity through an increase in habitat heterogeneity. Integration of units such as Econcrete: Tide Pool Armour or similar are recommended as they can be integrated into the detailed design whilst concomitantly delivering marine biodiversity enhancement.



Figure 2. Examples of water retaining features in rock armour.

The new outfall concrete encasement is deemed suitable for integration of a textured/grooved surface to enhance the growth of intertidal species. The textured features can be imprinted in precast elements which can be retrofitted or cast in-situ using textured formwork. This intervention has the potential to increase species abundance and algal species diversity. Care should be taken to ensure the aesthetic appeal of this enhancement. There is also potential for the encasement to be built using a concrete mix that enhances the growth of marine flora and fauna (lower alkalinity concrete mix). This would have potential to increase colonisation rate and increase species richness acting as a suitable offsetting / enhancement measure.

It was noted during the intertidal survey that instances of sheet piling along the frontage 2 walls were facilitating higher species abundance and diversity than the walls themselves by inadvertently creating artificial rockpools (see figure 4, photos G-H). Therefore, this area may be suitable for the addition of purpose made bolt on precast vertical pools (such as Vertipools™). Vertipools[3] are cast marine concrete unit products designed to be attached to sea defences to retain seawater as the tide recedes. These structures have the capacity to provide habitat where previously there was little water-retaining habitats and could support locally significant populations.

The above interventions are relatively straightforward and cost effective and have the potential to support greater biodiversity and facilitate climate change resilience through supporting biodiverse ecosystems, whilst maintaining compliance with duties and drivers to provide nature-based solutions that enhance local biodiversity and increase ecosystem resilience.

[3] https://www.artecology.space/vertipools/

Appendix A- Intertidal Biotope Survey Photos

a)



b)



c)



d)



Figure 3: Top Left: Frontage 1 seawall; view north. Top right; Frontage 1 seawall and rock armour; view north. Bottom Left: Frontage 1 intertidal area, view south. Bottom right: Frontage 1 intertidal area, view south.

e)



f)



g)



h)



Figure 4: Top left; Frontage 2 wall between frontage 1 and quay, view northwest. Top right: Closer view of Frontage 2 wall between frontage 1 and quay, view northwest. Bottom left: rock pool type habitat created by sheet piling. Bottom right, rock pool type habitat created by sheet piling.

i)



j)



k)



l)



Figure 5: Various points of frontage 2 wall, south of the Quay.

Appendix B- Proposed Site Layout

A1

Double leaf flood gate. Top of gate 5.30. Painted steel.

Existing paviors replaced with raised pedestrian crossing (blending).

Double leaf flood gate. Top of gate 5.30. Painted steel.

Existing stub wall and railings removed.

Paved area incorporated into Viaduct Gardens

New railings creating new perimeter to Viaduct Gardens

New raised section of seawall tapers down from 5.60 in corner to ground under viaduct.

New gulleys and chambers to increase highway drainage capacity at low point (arrangement tbc)

New setback wall at rear of gardens. Top of wall 5.30. Stone block masonry finish.

Control box for new underground pumping station and new chambers (arrangement tbc)

Arrangement TBC

Single leaf flood gate. Top of gate 5.30. Painted steel.

Single leaf flood gate. Top of gate 5.30. Painted steel.

Existing outfall and pipe onto beach to be removed

New surface water outfall on beach further out than existing and viaduct (exact levels and location tbc)

Existing seawall repaired and refaced with stone masonry cut from stones in existing seawall.

New raised section of seawall immediately behind but integral to repaired existing seawall. Top of wall 5.60. Stone block masonry finish.

Rock armour. Existing 'temporary' rock armour redistributed across front of seawall with additional smaller stones incorporated as required.

New mid-height step to tie in with existing at west end of wall. Stone block masonry finish (where visible above rock armour) with concrete top surface.

SCALE 1:200 (m)

Nodiadau / Notes

1. All dimensions are in millimetres unless noted otherwise.
2. All levels are in metres relative to ordnance datum Newlyn (mAOD) unless noted otherwise.
3. All coordinates are in metres relative to ordnance survey national grid.
4. Do not scale from this drawing. all dimensions must be checked / verified on site.

Legend

Land Ownership Boundary

Planning Application Boundary

Reference Drawings

285699-ARP-XX-DR-GEN-100
285699-ARP-XX-DR-GEN-110
285699-ARP-XX-DR-GEN-120
285699-ARP-XX-DR-GEN-150
285699-ARP-XX-DR-GEN-170

Hanes Fersiwn / Version History

Rev	Date	By	Chkd	Appd
P02	31.05.23	CF	JB	BM
WORK IN PROGRESS				
P01	07.03.23	CF	JB	BM
WORK IN PROGRESS				

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Cleient / Client

YGC

Llywodraeth Cymru
Welsh Government

Enw a Rhif y Prosiect Cyngor Gwynedd / Gynedd Council Project Name and Number

Cynllun arfordirol Gerddi Traphont

Viaduct Gardens Coastal Scheme

Teitl Lluniad / Drawing Title

Planning Application
Proposed Site Layout

Graddfa yn A1 / Scale at A1

1:200 @ A1

Rhan / Role

Civil Engineer

Addasrwydd / Suitability	Statws / Status
For Planning	S2
Rhif y Prosiect Arup / Arup Project Number	Adolygiad / Rev
285699-00	P02

Rhif y Lluniad / Drawing Number

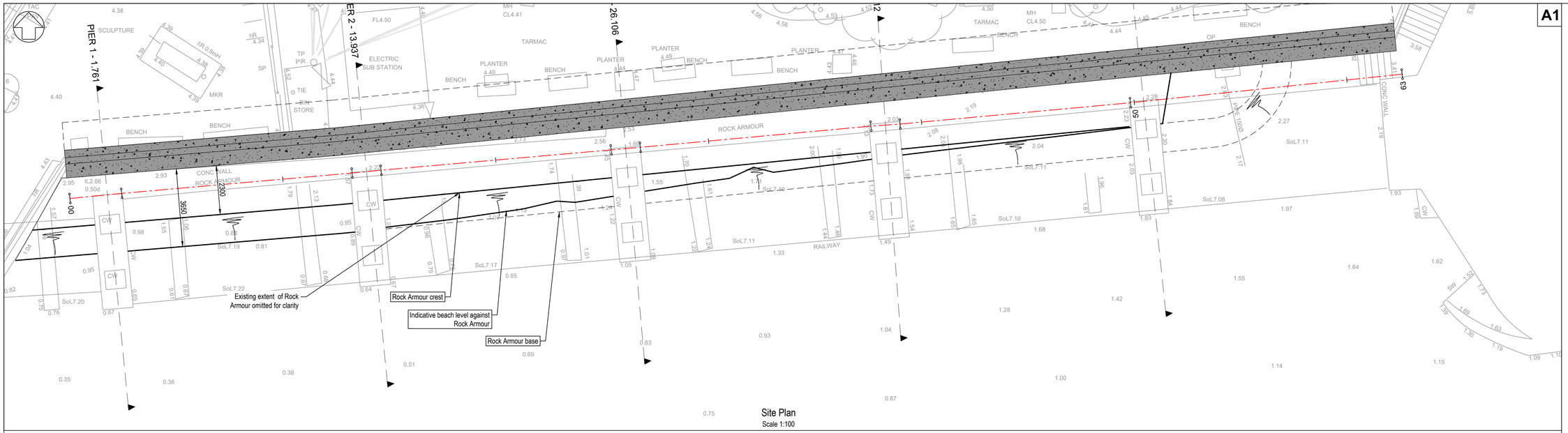
285699-ARP-XX-DR-GEN-150

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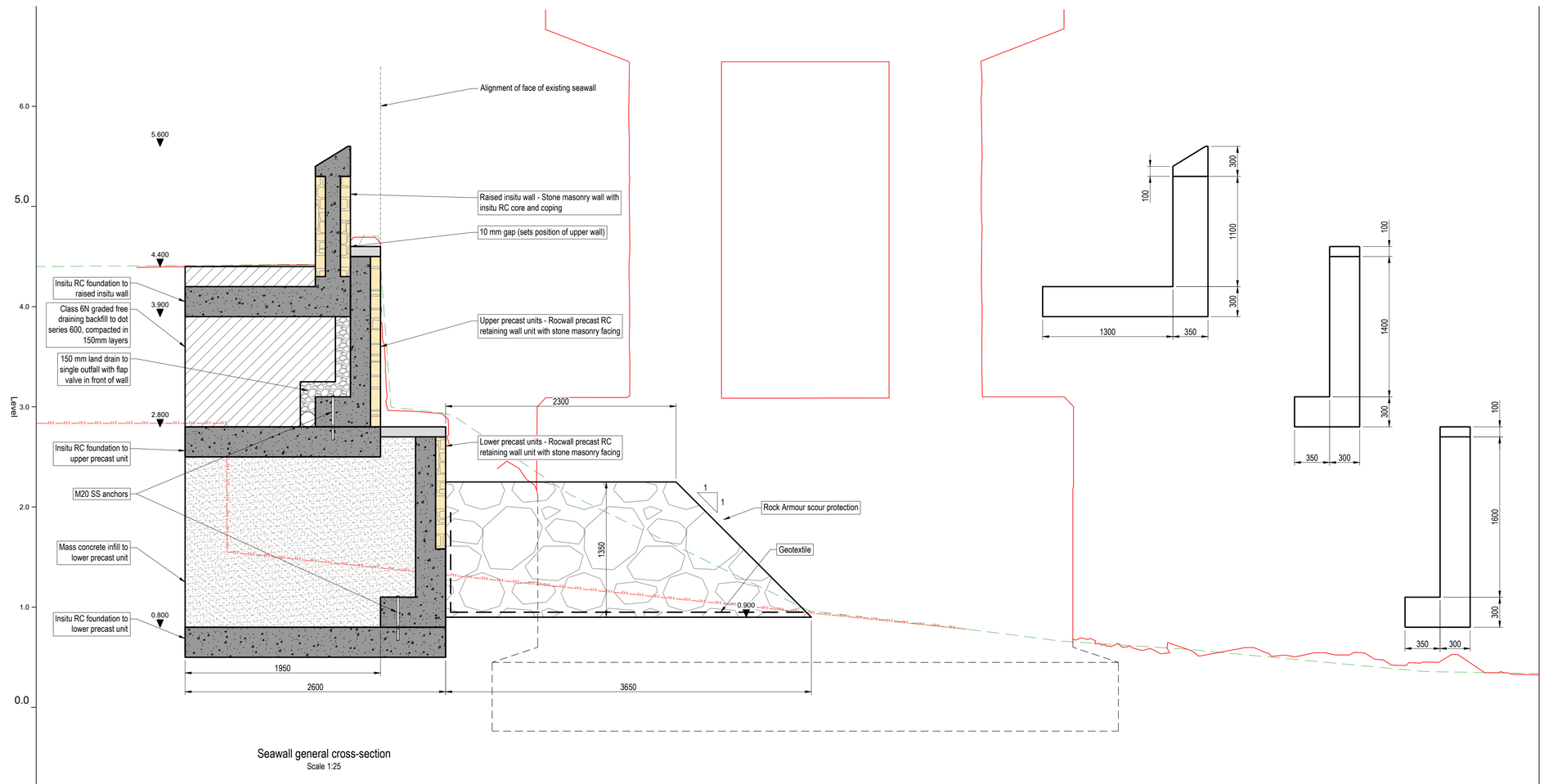
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Appendix C- Proposed Seawall Details-typical Section



Site Plan
Scale 1:100



Seawall general cross-section
Scale 1:25

DATUM (mAOD) -1.0

OFFSET	-5.00	-4.00	-3.00	-2.00	-1.00	0.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
EXISTING GROUND	4.40	4.41	4.42	4.42	2.95	2.34	1.80	1.31	0.93	0.81	0.69	0.61	0.53	0.44	0.36	0.34

PIER 1 - 1.761

1000 500 0 500 1000 1500 2000
SCALE 1:25 (mm)

5 4 3 2 1 0 2 4 6
SCALE 1:100 (m)

A1

Nodiadau / Notes

1. All dimensions are in millimetres unless noted otherwise.
2. All levels are in metres relative to ordnance datum Newlyn (mAOD) unless noted otherwise.
3. All coordinates are in metres relative to ordnance survey national grid.
4. Do not scale from this drawing. All dimensions must be checked / verified on site.
5. Rock Armour scour protection in front of new wall to re-use existing rocks, assumed 280t of 600-900mm (0.5-1.9t) material with Dn50=0.75m. Existing rocks to be placed on top layer and western end of frontage and imported rock armour of 0.3-1t grading is required to complete works. Layout assumes layer coefficient Kt=0.9. Existing bed levels to be reinstated post construction of scour protection.

Legend

- Existing surface derived from topo
- Existing surface derived from point cloud
- Existing information derived from historic drawings

Hanes Fersiwn / Version History

Rev	Date	By	Chkd	Appd
P01	31.05.23	CF	JB	BM
DRAFT FOR COMMENT				

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Llywodraeth Cymru Welsh Government

Enw a Rhif y Prosiect Cyngor Gwynedd / Gynedd Council Project Name and Number

Cynllun arfordirol Gerddi Traphont

Viaduct Gardens Coastal Scheme

Teitl Lluniad / Drawing Title

Proposed Seawall Details - Typical Section

Graddfa yn A1 / Scale at A1	
AS SHOWN @ A1	
Rhan / Role	
Civil Engineer	
Addasrwydd / Suitability	Statws / Status
For Information	S2
Rhif y Prosiect Arup / Arup Project Number	Adolygiad / Rev
285699-00	P01

Rhif y Lluniad / Drawing Number

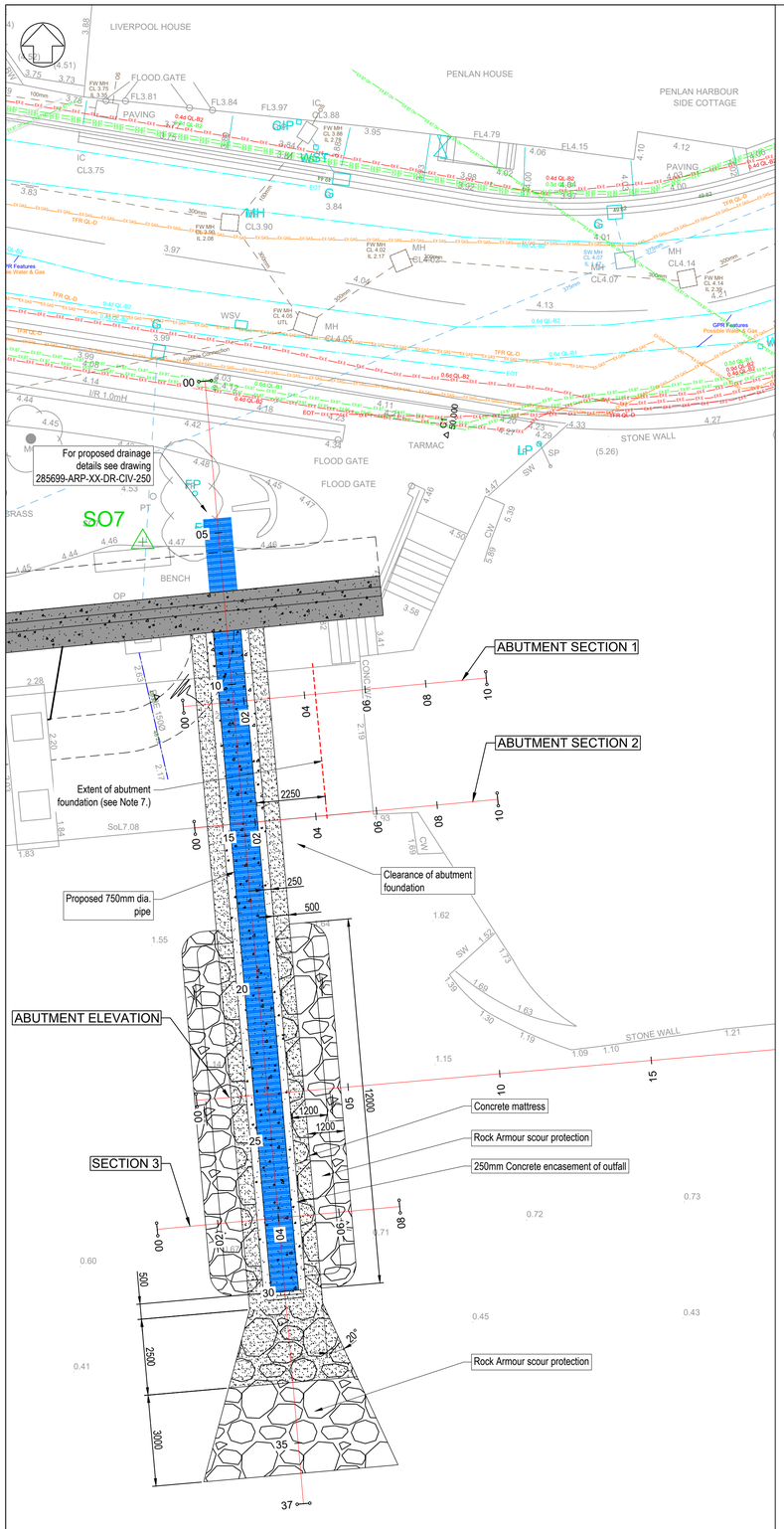
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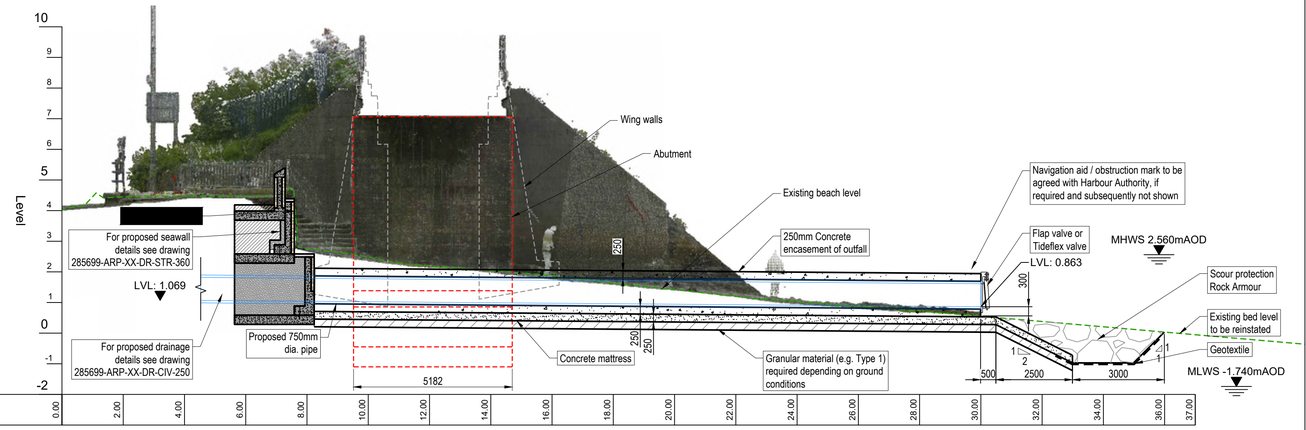
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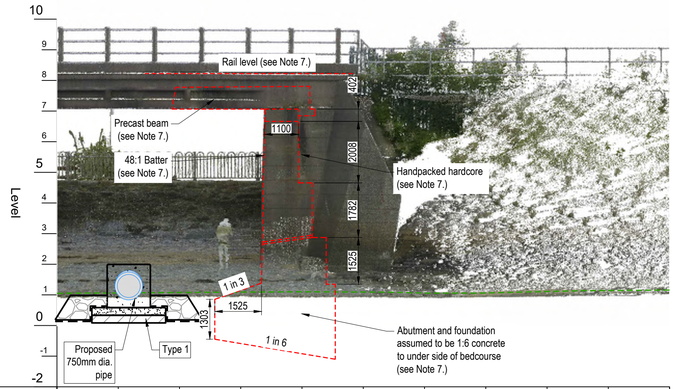
Appendix D- Proposed Drainage Sections- New Outfall



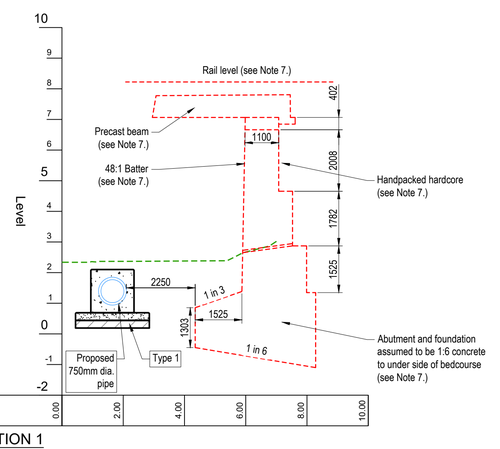
Site Plan
Scale 1:100



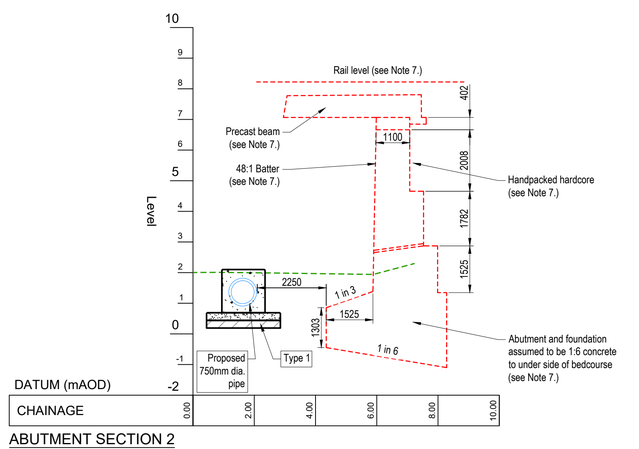
OUTFALL ALIGNMENT
SCALE: 1:100



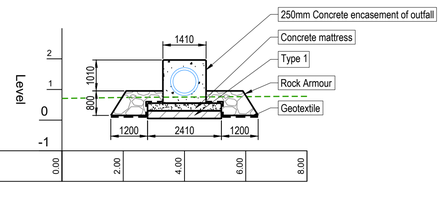
ABUTMENT ELEVATION
SCALE: 1:100



ABUTMENT SECTION 1
SCALE: 1:100



ABUTMENT SECTION 2
SCALE: 1:100



SECTION 3
SCALE: 1:100

SCALE 1:100 (m)

A1

Nodiadau / Notes

1. All dimensions are in millimetres unless noted otherwise.
2. All levels are in metres relative to ordnance datum Newlyn (mAOD) unless noted otherwise.
3. All coordinates are in metres relative to ordnance survey national grid.
4. Do not scale from this drawing. All dimensions must be checked / verified on site.
5. Refer to PN22427 Barmouth Viaduct Gardens Factual Report on Ground Investigation, Geotechnics (February 2023).
6. Outfall to extend on the foreshore until invert level is 300mm above bed level (minimum).
7. Abutment shown as derived from historical drawing of Barmouth Reconstruction of Old Chapel Viaduct Substructure.

Legend

- Information derived from historical drawings (see Note 7.)
- Existing beach level

Tide Levels

Datum	mAOD
HAT	3.26
MHWS	2.56
MHWN	1.26
MSL	0.26
MLWN	-0.54
MLWS	-1.74
LAT	-2.14

Hanes Fersiwn / Version History

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P02	08.06.23	CF	DO	BM
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P01	31.05.23	CF	DO	BM
DRAFT FOR COMMENT				

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Enw a Rhif y Prosiect Cyngor Gwynedd / Gynedd Council Project Name and Number

Cynllun arfordirol Gerddi Traphont

Viaduct Gardens Coastal Scheme

Teitl Lluniad / Drawing Title

Proposed Drainage Sections - New Outfall

Graddfa yn A1 / Scale at A1
AS SHOWN @ A1

Rhan / Role
Civil Engineer

Addasrwydd / Suitability	Statws / Status
For Information	S2
Rhif y Prosiect Arup / Arup Project Number	Adolygiad / Rev
285699-00	P02

Rhif y Lluniad / Drawing Number

285699-ARP-XX-DR-CIV-290

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Appendix E- Construction Methodology

Viaduct Gardens Construction methodology (Limited to works on wall and Outfall)

Sequence of Works

Wall Works

a) Access to the wall at beach level

a. Access to the seaward side of the wall will be via an existing ramp approx. 50m away from the wall.
b. Access is shared with current harbour activities.



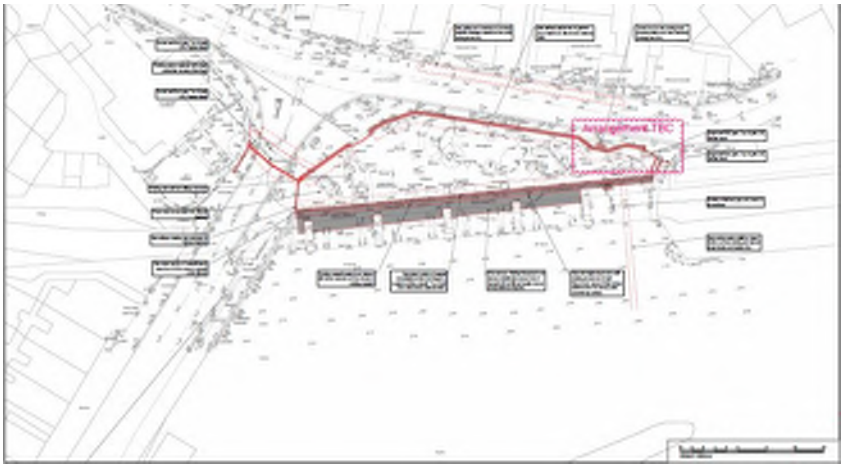
c. Plant using this access rout will return to the top of the ram storage area at the end of each shift.
d. Typical plant that will use this route will be tracked excavator and tracked dumper. Wheeled duper may be used if beach condition allows.
e. Majority of the works will be caried out from the viaduct garden side of the wall to avoid marine working.

b) Temporary works

a. Prior to dismantling the existing wall , some temporary support works will be required to stabile the structure and existing filled garden areas.
b. Sheet piling or king post walls will be used to support the embankment .
c. Installation of these will be manly form the Viaduct Garden side of the wall , with possible assistance form the back with an excavator.
d. Current wall and beach rock armour will remain in place during installation of temporary works.
e. Scaffolding may be required at the end of the works to construct the wall parapet . Scaffold poles may need to extend to beach level.
f. Existing surface water drainage outfalls will be maintained as active throughout the works until it is swapped over to the permanent works. Some minor over pumping may need to be carried out during wall construction with water pumped from the nearest upstream manhole from the outfall. Water will be pumped onto rock armour to prevent scour.

c) Existing wall demolition / Removal

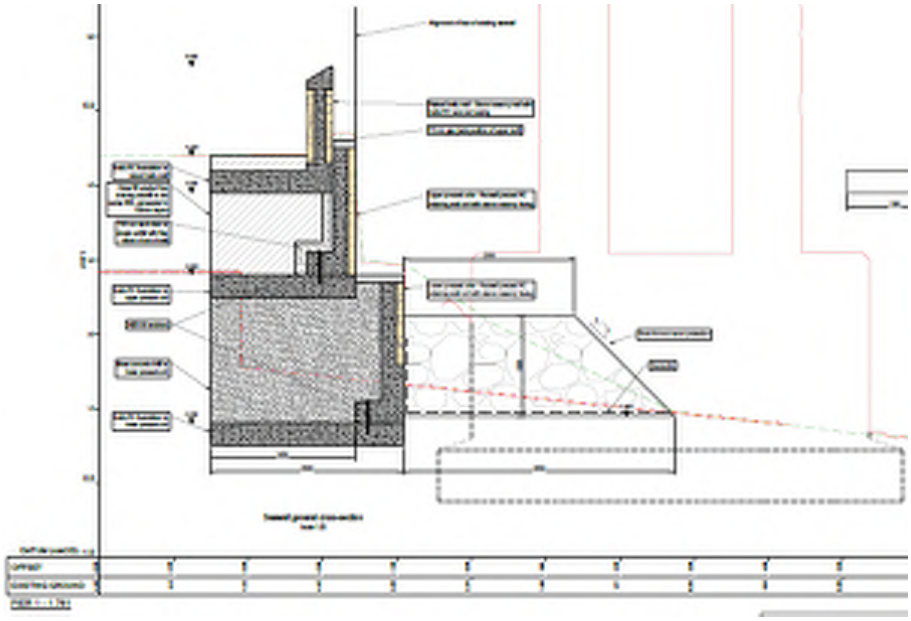
a. Exiting wall will be demolished in sections with exposed wall dependant of extent of temporary works protection to the embankment.



b. Existing rock armour at the toe of the wall will be moved back form the wall to expose the face - this material along with some additional armour as required will be re used as armour on completion of the new wall.
c. Upper part of stone wall will be removed and take into the gardens side of the wall for re use in the parapet.
d. Lower part of wall will be excavated down to the beach and loaded away for disposal or re-used as armour if suitable.
e. Excavation from behind the stone facing, to the temporary support will be loaded onto duper and taken away for disposal. Tis material is expected to be sand & gravel and only small amount to be retained as backfill if necessary to the gardens side.
f. Existing piped outfalls will have temporary supports as necessary.
g. Existing Electrical cable will be temporarily protected dusting this works.
h. Excavation work to the last 500mm to formation level will be done “just in time” to receive in situ concrete base slab.

d) Wall foundations

a. Wall foundation will be cast in situ as per drawing detail below



b. Concrete will be poured by skip or pump from the garden side of the wall (top of wall)
c. Concrete pour will be done early in shift to allow curing before next tide , with time times and heights monitored for the activity.
d. Pour length will match temporary support location / length installed for the embankment.
e. Existing rock armour will be positioned just other side of viaduct foundations to act as shelter , this may be reinforced with excavated sand / beach materials for the foundation dig.

e) Precast Wall

a. Top and middle sections will be PCC L shaped units as shown in the drawing above .
b. PCC units will be laid directly on the base in situ slab once cured. With the PCC unit anchored into the base slab using grouted in dowels.
c. PCC unit will be craned in by an excavator , either form the top of the embankment or from the bottom , dependant on working space around existing structures.
d. Once the lower unit is in place and anchored then joints will be sealed ready for the in-situ concrete backfill.
e. Temporary end shutters will be placed at the sections to be poured.
f. Concrete will be placed using pump or skip for the top of the wall.
g. Once the bas unit is in place and backfilled the wall will then no longer be tidal condition susceptible.
h. Middle wall (PCC) will be installed in same manner.
i. Backfill for middle wall will be done form the gardens side of the wall with placement and compaction carried out in thin layers.
j. Upper part of wall and where new and existing outfalls will be cast in situ.

f) Cast in situ sections

a. Areas where existing and new pipework / cabling protrude the wall will be cast in situ in lieu of using PCC units , this is to ensure flexibility in locating the pipe/ cable around the new wall.
b. One whole section of PCC unit will be left out and a shutter placed either side of the PCC unit – in situ sections will be 1.0 - 1.5m long.
c. In situ section will have reinforcement and will tie into the PCC units with dwells or similar.
d. In situ sections will be stone faced to match surrounding precast units with facing tied in with anchors to the concrete
e. Concrete pours for the will be done using pump or skip for the top of the wall.
f. There are approx. 2-3 areas where this method will be used. If pip sis only n lower section, then middle section can return to the PCC wall method and vice versa. This will minimise in situ concrete works.

g) In situ parapet wall

a. The parapet wall will be installed as an in-situ wall once the lower and mid sections are complete.
b. Base slab will be poured form the gardens side of wall , and rebar installed as starter bars.
c. Two stone walls facing will be built , with the middle of the wall being infilled with concrete .
d. Coping will be in situ concrete as shown on previous drawing. Access to the parapet will be mainly form the garden , with scaffold used on the seaward side.

h) Rock Armour

a. On completion of the lower and middle wall , access form the beach side will no longer be required , therefore the permanent rock armour can be installed.
b. Previously removed armour stored at beach level will be placed by excavator on the geotextile laid against the new wall .
c. Additional armour will delivered to the harbour side by road wagon and transferred to temporary stockpile.
d. Additional armour as required , will be brought to the wall using a dumper , with
e. Armour will be pace to profile as shown in the drawing above with care undertaken during placement around the viaduct foundations.
f. Beach will be reinstated around the viaduct and any waste/undersized armour removed or used as rip rap within the armour section.

Pipe outfall works

a) Temp works

a. Existing piped outfall will remain operational until new system is complete.
b. Rock armour excavated from the wall works may be used to protect the new piped outfall area during excavation and concrete works as a temporary measure . This bund may also be reinforced using excavated beach materials from the pipe works.

b) Pipe work installation

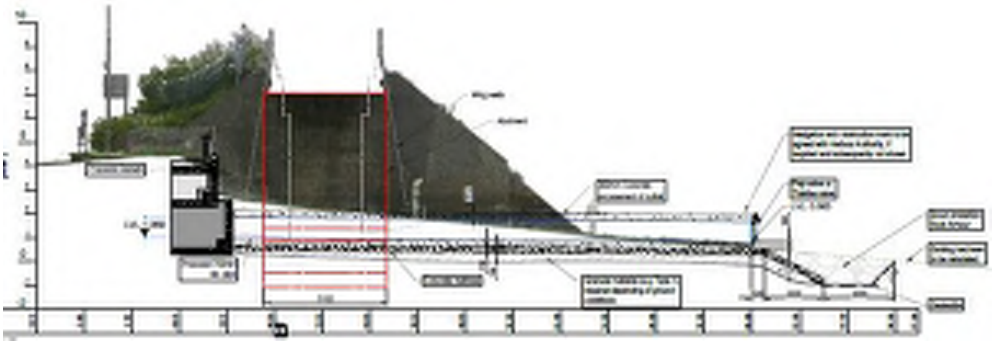
a. The new outfall pipe will be a 750mm diameter pipe and will protrude approx. 22m from the new wall face.



b. Timing of the works will be to coincide with good weather and low tides as excavation work vary but go as low as approx.. -0.5 Aod.
c. Pipework protruding through the new wall will have been previously installed with coupler inserted into the new wall
d. The beach material for the bed will be excavated out and new granular layer placed to provide a firm profile for the pipework , with material brough in by dumper across the beach.
e. Placement of the concrete mattress will be done when tides and Werther conditions are favourable , with accelerators considered to be used to ensure the concrete cures before next tide.
f. Pipework will be laid on the mattress on spacers to allow for the concrete surround to be placed.
g. Pipe will be coupled together in a sealed system . Pipe work will likely to be plastic material , with pipes rough to the works are down the ramp and across the beach
h. Temporary anchors will be pit on the pipe so it remains in correct position until surround is placed

c) Concrete surround

a. Once the bed mattress is cured, then the pipe will be laid to the line and level as shown in the drawing below

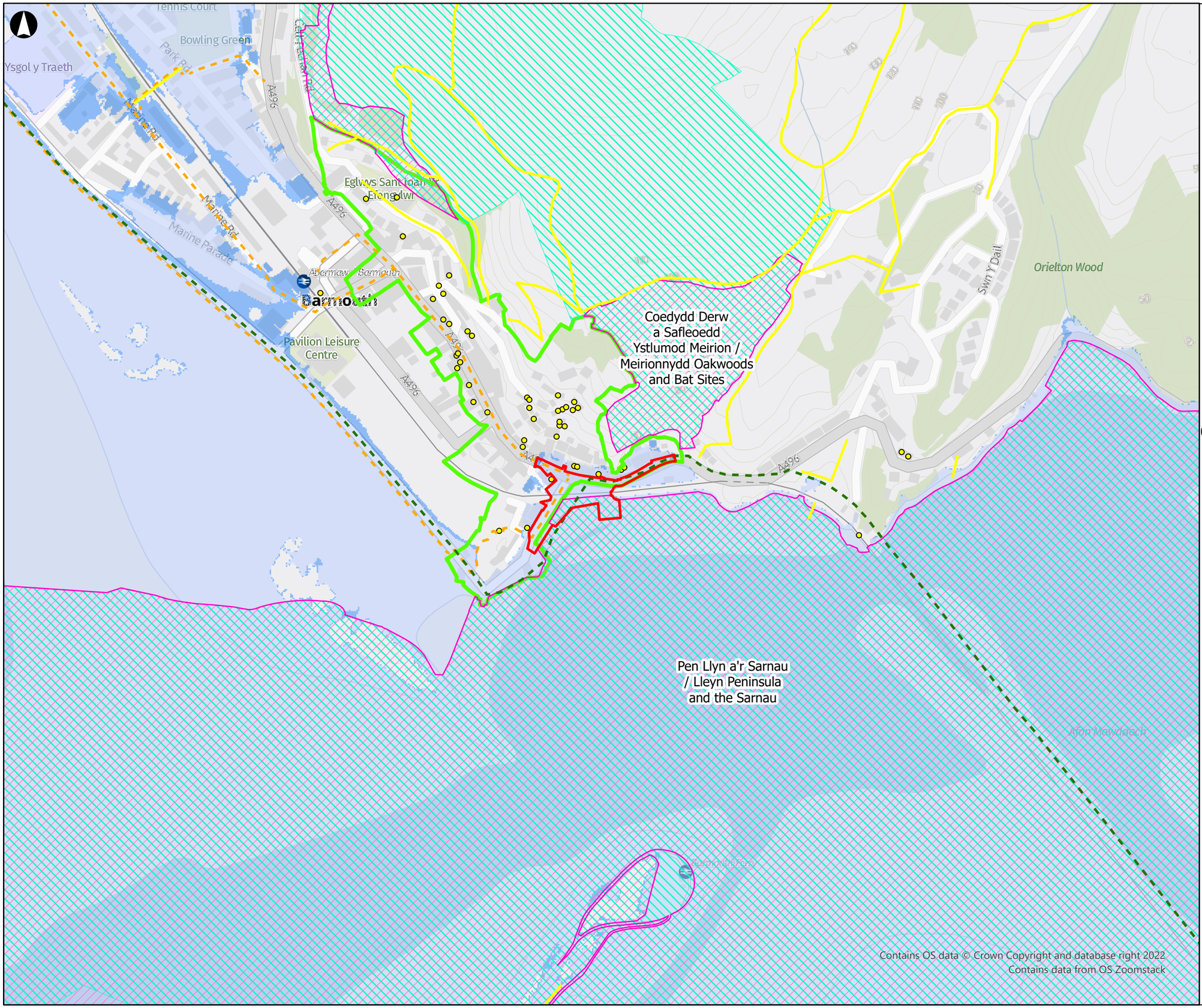


b. Pipe is to be fully bedded and surrounded in 250mm thick concrete.
c. Shutters will be placed either side of the pipe and anchored to the concrete mattress.
d. Concrete will either be pumped to works area or brough in with dumper and place with excavator.
e. Shutters will be removed once concrete is cured and take off site .

d) Outfall detail

a. The anti-scour basin will be constructed once the pipe is fully surrounded in concrete.
b. Rock armour will be paced in the end by excavator with material brough in by dumper along the beach.
c. A bolt on flap valve or tide vale will the installed at the end of the pipework
d. Once complete any rock armour used as temporary protection will be removed and taken back to the wall as permanent works.
e. Beach levels will be restored round the new pipe and ant debris form the works cleared away .

Appendix F- Environmental Constraints Plans



A3

13/06/2023 11:06

Legend

- Site Boundary
- Public Rights of Way
- Wales Coastal Path
- Active Travel Approved Routes
- Listed Buildings
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Conservation Area
- Flood Zone 2
- Flood Zone 3

Coordinate System:

--

Meters

0 50 100 200 300

Rev	Date	By	Chkd	Appd	Authd
P02	08/06/23	BF	SC	GM	--

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Client
YGC Gwynedd Council

Project Name
Barmouth Flood Alleviation Scheme Viaduct Gardens

Drawing Title
Environmental Constraints Plan- Local Constraints

Scale at A3
1:5.000

Role
Environmental

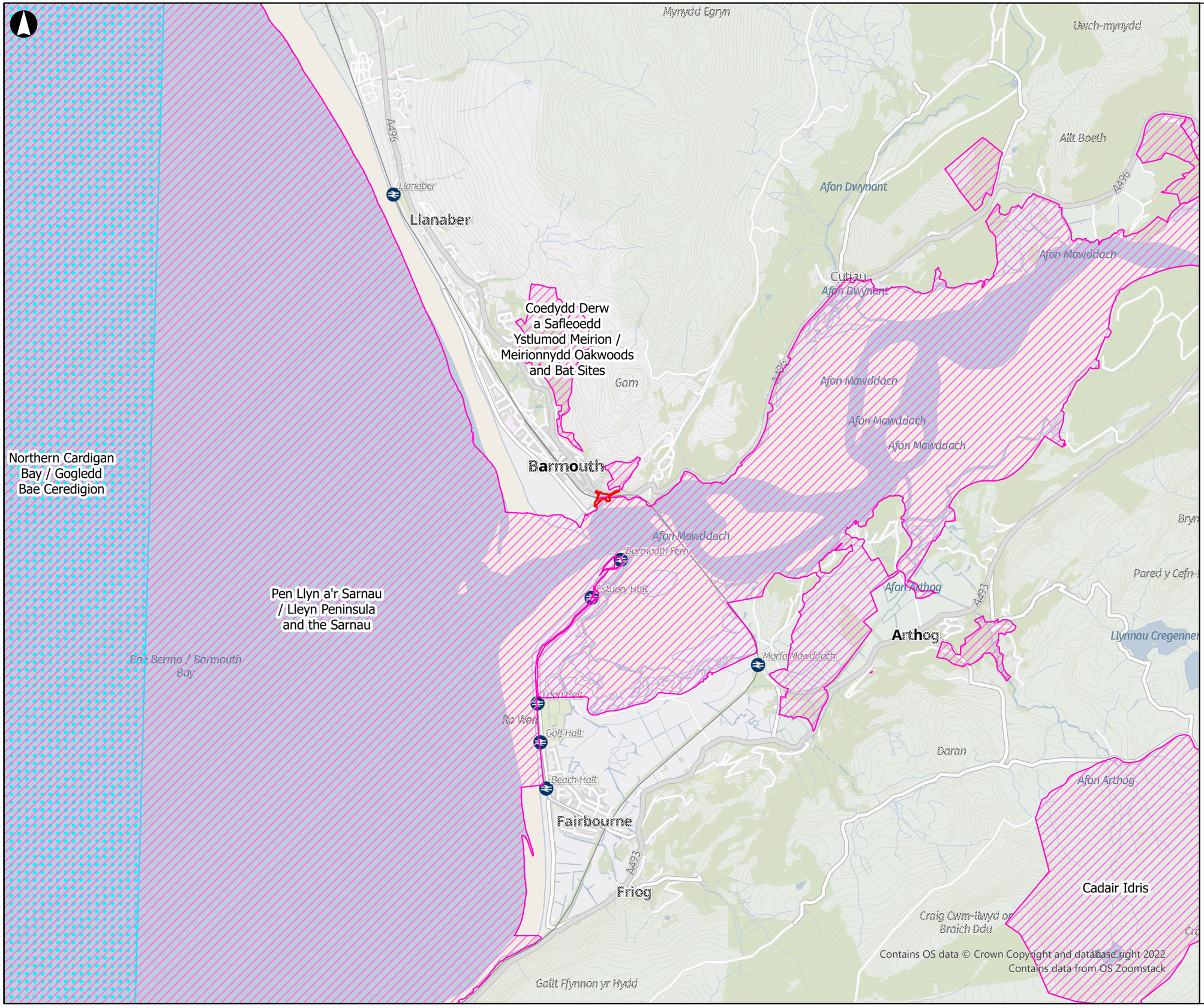
Suitability
For Information

Project Number
285699

Rev
P02

Drawing Number
285699-ARP-XX-DR-ENV- 501

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A3

13/06/2023 11:32

Legend

- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Site Boundary

Coordinate System:

Kilometres

0 0.25 0.5 1 1.5

Rev	Date	By	Chkd	Appd	Authd
P02	08/06/2023	BF	SC	GM	--

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Client
YGC Gwynedd Council

Project Name
Barmouth Flood Alleviation Scheme Viaduct Gardens

Drawing Title
Environmental Constraints Plan- European Sites

Scale at A3
1:30.000

Role
Environmental

Suitability
For Information

Project Number	Rev
285699	**P02**

Drawing Number
285699-ARP-XX-DR-ENV-500

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Appendix E

Stage 1 Screening Habitat Regulations Assessment (HRA)

ARUP

Ymgynghoriaeth Gwynedd Consultancy (YGC)

Viaduct Gardens, Barmouth - Flood Alleviation Scheme (FAS)

Habitats Regulations Assessment (HRA) – Preliminary Screening Report

Reference: 285699-ARP-XX-RP-ENV-005

V1 | 27 June 2022



This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 28569900

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United Kingdom
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Contents

Executive Summary **5**

1. Introduction **6**

1.1 Purpose of this Document 6

1.2 Structure of this Report 6

1.3 The HRA Process 7

1.4 Consideration of Mitigation 7

2. Project Description **8**

2.1 Site Description 8

2.2 Description of the Proposed Works 8

2.3 Environmental Baseline 8

3. Guidance and Methodology **10**

3.1 Guidance and Policy 10

3.2 Desk Study information 10

3.3 Habitats Regulations Assessment Methodology 10

3.4 Limitations 11

4. European Sites Potentially Affected by the Proposal **12**

4.1 Identification of European Sites 12

4.2 Pen Llŷn a'r Sarnau /Lleyn Peninsula and the Sarnau SAC 17

4.3 Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC 20

4.4 Northern Cardigan Bay SPA 22

4.5 Morfa Harlech a Morfa Dyffryn SAC 22

5. Screening Assessment **25**

5.1 Potential Effects of the Project 25

5.2 Identification of Other Plans and Projects 26

5.3 Consideration of Effects and Significance 26

6. Recommendations **29**

6.1 Species-specific surveys 29

6.2 General Mitigation During Construction 29

7. Conclusions **30**

Tables

Table 1: Features for the Designation of European Sites that are Potentially Affected by the Proposed Works 13

Table 2: Potential construction effects of the project on the European Sites and their features 28

Appendices

Appendix A **A-31**

A.1 Habitat Regulations Assessment A-32

Appendix B **B-1**

Designated Sites B-1
B.1 European Sites within 10km of the Site B-1
B.2 Natura 2000 Standard Data Forms for European Sites B-2

Executive Summary

This document has been prepared by Ove Arup and Partners Limited (Arup) on behalf of Ymgynghoriaeth Gwynedd Consultancy (YGC), in relation to the potential for effects on European Sites, as required by Regulation 63(1) of the Habitats Regulations with respect to proposed works to reduce the risk of coastal flooding to properties at the Viaduct Gardens frontage in Barmouth, Gwynedd.

This report comprises a preliminary Screening Habitats Regulation Assessment (HRA) and outlines that in the absence of mitigation there are pathways for effects present which are considered to have the potential to cause significant adverse effects on the following European Sites: Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau Special Area of Conservation (SAC); Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC; Morfa Harlech a Morfa Dyffryn SAC; and Cardigan Bay Special Protection Area (SPA)

Pathways for effects are identified for four European Sites and therefore an Appropriate Assessment is required for the proposed works. The requirement for species-specific surveys is subject to change as the detailed design of the proposed works is developed and will be kept under review.

This report is produced solely for the benefit of Ymgynghoriaeth Gwynedd Consultancy - Gwynedd Council and no liability is accepted for any reliance placed on it by any other party. This report is prepared for the proposed uses stated in the report and should not be used in a different context.

1. Introduction

Ove Arup and Partners Limited (Arup) has been commissioned by Ymgynghoriaeth Gwynedd Consultancy (YGC) of Cygnor Gwynedd Council (CGC) to undertake a preliminary Habitats Regulation Assessment (HRA) report in compliance with the requirements of the Conservation of Habitats and Species Regulations 2017 (as amended); hereafter referred to as the 'Habitats Regulations'. This report is preliminary and should be updated when works are confirmed, and as such focuses on Stage 1 of the HRA process, assessing the likelihood of the project having a significant effect on a European Site or its features. This is the trigger for the need for an Appropriate Assessment as set out in Regulation 63(1). Although a full Appropriate Assessment (Stage 2) has not been conducted within this report, consideration of the potential effects of the project in relation to the conservation objectives for the European Site(s) has been undertaken to determine if, in the absence of design avoidance and/or mitigation measures, there is likely to be an adverse effect on the integrity of the site (i.e. an effect that would compromise the site meeting its conservation objectives).

Barmouth (Abermaw) in Gwynedd, Wales is located on the northern shore on the mouth of the Mawddach Estuary. Barmouth seafront is prone to flooding due to both overtopping of the sea wall and surface run-off from the bluff behind the town (Dinas Oleu). A Project Appraisal Report (PAR) was originally undertaken in 2004. This was updated in 2018 and formed the basis of an Outline Business Case (OBC), approved June 2021.

The OBC presented five objectives of the Scheme:

1. Reduce the risk of coastal flooding to properties at the Viaduct Gardens frontage, Barmouth;
2. Maintain existing landscape character of the area whilst enhancing sea defences;
3. Reduce flood risk to the A496 county road;
4. Enhance sea defences without causing damage/ harm to the natural environment; and
5. Maintain the Cambrian coast railway.

Nine options were presented within the OBC for coastal flood risk management along the seafront, of which Option 8 was preferred. Option 8 works include:

- a raised sea wall with new access gates;
- repairs to the existing sea wall;
- a new 450mm culvert in Church Street with gullies; and
- a new pumping station and outfall to upgrade existing network with additional gullies.

1.1 Purpose of this Document

This document has been prepared by Arup on behalf of CGC, as a competent authority, in relation to the potential for effects on European Sites as required by Regulation 63(1) of the Habitats Regulations.

1.2 Structure of this Report

This report uses the following structure:

- Section 2 provides information on the proposed works (the 'project') including the environmental baseline and a description of the development;
- Section 3 provides information on the data and methodology used in the assessment;
- Section 4 provides information on the European Sites that are considered within the assessment;
- Section 5 provides a screening assessment for the potential pathways for effects; and

- Section 6 & 7 provides recommendations and conclusions.

1.3 The HRA Process

Regulation 63 of the Habitats Regulations requires a competent authority to make an 'Appropriate Assessment' of the implications of the plan or project for that site in view of its conservation objectives, before deciding to undertake or give consent for a plan or project which (a) is likely to have a significant effect on a European Site (either alone or in combination with other plans or project), and (b) is not directly connected with or necessary to the management of that site. In light of the conclusions of the assessment, the competent authority may proceed with or consent to the plan or project only after having ascertained that it will not adversely affect the integrity of the European Site.

All plans and projects should identify any possible effects early in the plan/project making process and then either alter the plan/project to avoid them or introduce mitigation measures to the point where no adverse effects remain. The 'competent authority' shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned, and if appropriate having obtained the opinion of the general public.

The assessment of a project under the Habitats Regulations can be split into several sections as shown in Appendix A.1[1]; however, there are effectively four stages to the assessment as described below.

Stage 1 is the assessment of the likelihood of a plan or project having a significant effect on a European Site or its features. This is the trigger for the need for an Appropriate Assessment as set out in Regulation 63(1). The Appropriate Assessment (Stage 2) is the detailed consideration of the potential effects of the plan or project in relation to the conservation objectives for the European Site(s) to determine if there is likely to be an adverse effect on the integrity of the site (i.e. an effect that would compromise the site meeting its conservation objectives). Providing it can be demonstrated that with appropriate mitigation measures the plan or project would not give rise to an adverse effect on the integrity of a European Site, the plan or project can proceed.

Where this cannot be demonstrated or there is uncertainty, the assessment would then need to consider if there were any other alternatives to the plan or project (Stage 3) that would not give rise to adverse effects on the integrity of the European Site. If there are no alternatives, Stage 4 would then consider if there are any Imperative Reasons of Overriding Public Interest (IROPI), only at this stage can Compensatory Measures be considered. It is very unusual for plans or projects to be considered in Stages 3 or 4.

1.4 Consideration of Mitigation

With regards to recent case law (Coillte vs People Over Wind[2]) the inclusion of plainly established and uncontroversial mitigation during Stage 1 is no longer considered appropriate. Mitigation, as considered by the Centre Européen de Coopération Juridique (CECJ) in regard to the case law[2], is interpreted to mean measures that are intended to avoid or reduce the harmful effects of the envisaged project on the site concerned.

Consequently, any project which identifies an impact on a European Site and where avoidance and mitigation is applicable will need to address these measures during Stage 2 Appropriate Assessment.

[1] Tyldesley, D. (2011). Assessing Projects Under the Habitats Directive: Guidance for Competent Authorities. Bangor: Countryside Council for Wales.

[2] People over Wind, Case C323/17 European Court of Justice, 12th April 2018.

2. Project Description

2.1 Site Description

Viaduct Gardens is an area in the town of Barmouth (Abermaw) in Gwynedd, North Wales. Located just north of Barmouth Viaduct at NGR SH 61580 15545, 0.5km south-east of Barmouth town centre. Viaduct Gardens is a pedestrianised area, approximately 570m^2 which is bordered by Porkington Terrace and A496 to the north, the Quay to the west and Barmouth Bridge and sea wall to the south, seaward side. A combined pump, combined sewer overflow (CSO) and electricity substation are present within Viaduct Gardens.

The area shows signs of slipping as a result of overtopping from waves, including concrete cracking and collapsing rock revetments. Temporary flood defence measures are currently use where sandbags have been placed inside the gaps of rock revetments. The sand level has lowered since installation of the viaduct which has led to exposure of pumping station cables. There is evidence of spawling from rust reinforcement at the feet of the viaduct, which was built in 1950s.

2.2 Description of the Proposed Works

The project area is outlined in Appendix B (Figure 1) and described below. The proposed Scheme at Viaduct Gardens achieves the following high-level Objectives:

- Reduce the risk of coastal flooding to properties at the Viaduct Gardens frontage, Barmouth;
- Maintain existing landscape character of the area whilst enhancing sea defences;
- Reduce flood risk to the A496 county road;
- Enhance sea defences without causing damage/harm to the natural environment; and
- Maintain the Cambrian coast railway.

To achieve these Objectives within a timely manner, the Scheme is comprised of two main elements. This proposed approach allows the Scheme to arrive at an optimum outline design solution to reduce the risk of flooding first before progressing to detail design and finally tender documentation:

1. Repair harbour (retaining wall), install parapet defence and improve drainage at Viaduct Gardens; and

2. Challenge wall raising and access barriers on Quayside – exploring Property Resilience Measures.

The Scheme to repair existing and construct new flood defences, outfalls and a pumping station is proposed to intersect the boundary of the Pen Llyn a'r Sarnau/ Lleyn Peninsula and the Sarnau SAC. The Scheme proposal is also adjacent to the Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites Special Area of Conservation SAC.

2.3 Environmental Baseline

An Extended Phase 1 Habitat Survey was undertaken by an Arup Ecologist between the 9th and 10th February 2022.

The survey was carried out in accordance with standard Joint Nature Conservation Committee (JNCC) Extended Phase 1 Habitat survey methodology[3]. A desk study search was also carried out, with data received from NRW on 13th October 2021. The results of these are included in the Preliminary Ecological Assessment Report[4] and summarised below.

The Site consisted of a mosaic of habitats including scattered scrub, broadleaved and coniferous scattered trees, intertidal mud/sand, intertidal mud/sand with brown algal beds, intertidal shingles/cobbles, intertidal

[3] Joint Nature Conservation Committee (2010). Handbook for Phase 1 habitat survey – a technique for environmental audit.

[4] Arup (2022). Viaduct Gardens, Barmouth – Preliminary Ecological Appraisal (PEA). Document Reference: 285699-ARP-RP-ENV-003. (28 April 2022)

shingles/cobbles with green algal beds, intertidal boulders/rocks, intertidal boulders/rocks with brown algal beds, amenity grassland, introduced shrub and other exposure such as rock exposure that has been colonised by vegetation.

The Site contains habitat suitable to support protected and notable species including commuting and foraging bats and otter (*Lutra lutra*); as well as over-wintering and passage wading and waterbirds. In particular, there is reef habitat suitable for foraging present in the onsite Pen Llyn a'r Sarnau/ Lleyn Peninsula and the Sarnau SAC and Northern Cardigan Bay SPA to support over-wintering red-throated divers (*Gavia stellata*)[5].

Common goby (*Pomatoschistus microps*) was recorded within the estuary during low-tide, underneath rocks within the intertidal habitat. The mosaic of habitat within the estuary provides opportunity for many species that thrive in intertidal habitat.

No Invasive Non-native Species (INNS)[6] were identified during the Extended Phase 1 Habitat survey, however the survey was undertaken at a sub-optimal time of year for INNS identification and thus a pre-construction INNS survey is recommended. Records of Japanese rose (*Rosa rugosa*) and Japanese knotweed (*Reynoutria japonica*) and montbretia (*Crocosmia pottsii x aurea = C. x crocosmiiflora*) were provided from the desk study search.

Appendix B identifies the European Sites within 2.0km of the project extending to 10.0km to include European Sites with a hydrological connection to the Site. These sites are described in detail in Table 1 in Section 4 below.

[5] See Appendix B.2 for European Sites Natura 2000 Standard Forms.

[6] As listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and the Invasive Alien Species (Enforcement and Permitting) Order 2019.

3. Guidance and Methodology

This section sets out the guidance and evidence base used in assessing the potential effects of the project.

3.1 Guidance and Policy

This report has been informed by the following guidance and policy documents:

- Planning Policy Wales - Technical Advice Note (TAN) 5: Nature Conservation and Planning[7];
- The Habitats Regulations Assessment Handbook, DTA Publications Ltd[8]; and
- Tyldesley, D. and Chapman, C. 2018. People Over Wind2 – some Implications of the Judgment. The Habitat Regulations Journal, Issue 10, pp. 19 – 23.

This guidance is intended to improve understanding of how projects are regulated under the Habitats Directive. This guidance draws on experience throughout Britain and on case law in Britain and Europe.

3.2 Desk Study information

In addition to the guidance noted above, a number of websites were used to gather information on the European Sites in order to inform this assessment, in particular, the Management Plans for European Sites and Regulation 37 information. Websites used include:

- Natural Resources Wales (NRW) (and legacy body Countryside Council for Wales (CCW)[9]) website[10];
- Cofnod - the Local Environmental Records Centre for North Wales[11];
- Multi-Agency Geographical Information for the Countryside (MAGIC) website[12]; and
- Joint Nature Conservation Committee (JNCC)[13].

The documents obtained provide the main elements of NRW's management plans for European Sites along with the Conservation Objectives for the features. The features will be considered to be in Favourable Conservation Status only when the conservation objectives are being met. These objectives therefore provide an indication of the type of effects which could affect the features of the European Site. An effect which could affect the ability of a site or feature to meet its objective could be considered to be an adverse effect on the integrity of the European Site concerned.

3.3 Habitats Regulations Assessment Methodology

To understand the potential implications for European Sites from the project it is necessary to identify those sites that are located close to the project or are linked by pathways such as hydrological connections.

All European Sites, including European Marine Sites, within 2.0km of the project were identified using Geographic Information System data from datasets downloaded from the JNCC, MAGIC and NRW. This

[7] Welsh Government. (2021). Planning Policy Wales - Technical Advice Note 6: Nature Conservation and Planning. Cardiff: Welsh Government.

[8] Tyldesley, D. and Chapman, C. (2013) The Habitats Regulations Assessment Handbook. Nov 2019 edition. UK, DTA Publications Ltd. Available at: <https://www.dtapublications.co.uk/>.

[9] CCW has been amalgamated with the Environment Agency Wales and the Forestry Commission in Wales to form Natural Resources Wales.

[10] Natural Resources Wales Find Protected Areas of Land and Seas. Available at: <https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/find-protected-areas-of-land-and-seas/designated-sites/?lang=en>.

[11] Available at: <https://www.cofnod.org.uk/Home>.

[12] Available at: <https://magic.defra.gov.uk/MagicMap.aspx>.

[13] Available at: < https://jncc.gov.uk/>.

was extended to 10.0km for sites for which bats are a qualifying feature or sites where a direct hydrological pathway was noted.

3.3.1 Understanding Qualifying Interests and Conservation Objectives

For each of the sites identified, the qualifying features were established and the conservation objectives for each feature were obtained. Information was also sought to understand the potential vulnerability of the features to any effects that might arise from the project.

3.3.2 Identification of the Potential Effects of the Project

Any potential pathways for effect on European Sites resulting from the project were identified prior to consideration of best practice procedures (for example, Guidelines for Pollution Prevention and Construction Industry Research and Information Association (CIRIA) guidance) or the integration of any mitigation measures.

3.3.3 Identification of Plans or Projects Considered for In-Combination Effects

An 'in-combination' assessment is required where the project may have an effect on a European Site, but on its own the effects would not be significant. The potential effects of the project should be considered in-combination with other plans or projects that similarly may have an effect, where the combined effects may become significant.

Details of other plans and projects which are currently proposed or consented within the vicinity of the European Sites identified were obtained from the local planning authority website[14] to inform the in-combination assessment of the project.

3.3.4 Consideration of the Significance of Potential Effects

The significance of potential effects was assessed in the absence of any avoidance and/or mitigation measures. The assessment has been made with awareness of the conservation objectives for the features of the European Sites, although as stated in the relevant guidance the assessment of the project against the conservation objectives is not required until the Appropriate Assessment stage of the HRA process. In the assessment of the significance of effects, professional judgement was applied using the following criteria (as sufficient information about the elements and interests is often unavailable):

- The vulnerability/sensitivity of the receiving environment/features of interest;
- When the risk of effects is likely to occur (e.g. construction and/or operation);
- The likely geographical extent of the effects; and
- Likelihood of significant effects (e.g. those above negligible in magnitude) occurring based on previous experience with similar elements, where available.

Where there was not enough information about the risk of qualifying interest being present, or of the risk of effects, the assessment used the precautionary principle to inform the judgement. The precautionary principle has been applied to ensure that any assessment errs on the side of caution, without being overly cautious. This principle means that the conservation objectives should prevail where there is uncertainty or that harmful effects will be assumed in the absence of evidence to the contrary.

3.4 Limitations

Information provided by third parties, including publicly available information and databases, is considered correct at the time of publication. Due to the dynamic nature of the environment, conditions may change in the period between the preparation of this report, and the construction and operation of the project.

[14] Gwynedd Council, Search for a Planning Application (accessed 28th May 2022). Available at: <https://amg.gwynedd.llyw.cymru/planning/index.html?language=en&fa=search>.

The HRA has been undertaken in as detailed a way as possible, using all available data sources where they exist. However, the conclusions drawn from this is necessarily limited by the age, type, coverage and availability of data. Any uncertainties and the limitations of the assessment process are acknowledged and highlighted. It must be noted that at the time of writing this report the detailed design of the works is unknown. It is recommended that an updated HRA is written once details are established.

Recommendations for mitigation measures to address the potential adverse effects on European Site integrity identified by this report are also based on the information available at the time of the assessment, including the unknown level of works, which makes this approach precautionary.

In the Extended Phase 1 habitat survey, a precautionary approach was adopted for the indicative extents of identified invasive non-native species (INNS) that may have died back in the autumn and winter months, and it should be noted further that some species may not have been visible at all due to the timing of the survey, as such further surveys are recommended within appropriate survey seasons.

4. European Sites Potentially Affected by the Proposal

4.1 Identification of European Sites

Appendix B.1 shows the location of the project in relation to European Sites within 2.0km of the project, and those within 10km where there is a direct downstream hydrological connection to the project.

Two European Sites were identified within 2.0km of the project:

- Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau SAC, located on site within the tidal area of the project; and
- Coedydd Derw a Safleoedd Ystlumod Meirion/ Merionnydd Oakwoods and Bat Sites SAC, located 20m south-east of the project.

Two additional European sites were identified to have a hydrological connection within 10.0km of the project:

- Gogledd Bae Ceredigion/ Northern Cardigan Bay Special Protection Area (SPA) is located 3.5km west of the project, hydrologically connected downstream of the project;
- Morfa Harlech a Morfa Dyffryn SAC is located 7.1km north-west of the project, hydrologically connected downstream of the project along the west coast; and

The three European Sites listed below were located within 10km of the project with no hydrological connection and therefore are not considered further in this report:

- Cadair Idris SAC is located 4.3km south-east of the project;
- Craig yr Aderyn (Bird’s Rock) SPA is located 8.6km south-east of the project; and
- Rhinog SAC is located 9.5km north of the project.

The features for which the identified European Sites have been designated are summarised in Table 1, with further details relating to their conservation objectives detailed in section 5 .below. The Natura 2000 Standard Data Forms, as well as other information sheets for the European Sites can be found in Appendix B.2.

Table 1: Features for the Designation of European Sites that are Potentially Affected by the Proposed Works

European Site Name and Code	Location and Distance of European Site from the Project	European Site Size (ha)	Key Features of the European Site	Vulnerability of the European Site	European Site Conservation Objectives
Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau SAC (UK0013117)	Located in northwest Wales, Tremadog Bay, central NGR SH401130. Within the site boundary on the eastern aspect, within Mawddach Estuary.	146,010.52	**Annex I habitats that are a primary reason for designation:** • Sandbanks which are slightly covered by sea water all the time; • Estuaries; • Coastal lagoons; • Large shallow inlets and bays; and • Reefs **Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:** • Mudflats and sandflats not covered by seawater at low tide; • Salicornia and other annuals colonizing mud and sand; • Atlantic salt meadows; and • Submerged or partially submerged sea caves. **Annex II species present as a qualifying feature, but not a primary reason for site selection:** • Bottlenose dolphin (*Tursiops truncatus*); • Otter; and • Grey seal (*Halichoerus grypus*).	The Natura 2000 site Standard Data Form states that the following threats and pressures have a high impact on the SAC: • Grazing; • Invasive non-native species; • Human induced changes in hydraulic conditions; • Fishing and harvesting aquatic resources; and • Other human intrusions and disturbances.	The conservation objectives for Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau SAC are for a high quality marine and coastal environment which is healthy, productive and biologically diverse, supporting resilient marine ecosystems and communities. The special habitat and species features of the SAC will be maintained and, where necessary, restored so that they will be able to sustain themselves in the long-term as part of naturally functioning ecosystems. The diversity of the wildlife habitats and species in the SAC will not be degraded[15].

[15] Pen Llŷn a'r Sarnau /Lleyn Peninsula and the Sarnau SAC; Core Management Plan Including Conservation Objectives, February 2009

European Site Name and Code	Location and Distance of European Site from the Project	European Site Size (ha)	Key Features of the European Site	Vulnerability of the European Site	European Site Conservation Objectives
Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC (UK0014789)	Located in west Wales and the Valleys, Beddgelert, central NGR SH58604760. 20m south-east of the Site.	2,812.79	**Annex I habitats that are a primary reason for designation:** • Old sessile oak woods with Ilex and Blechnum in the British Isles; and • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) **Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:** • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation; • Northern Atlantic wet heaths with *Erica tetralix*; • European dry heaths; • *Tilio-Acerion* forests of slopes, screes and ravines; and • Bog woodland. **Annex II species that are a primary reason for selection of this site:** • Lesser horseshoe bat (*Rhinolophus hipposideros*).	The Natura 2000 site Standard Data Form states that the following threats and pressures have a high impact on the SAC: • Pollution to surface waters (limnic, terrestrial, marine & brackish); • Air pollution, air-borne pollutants; • Invasive non-native species; and • Grazing.	The conservation objectives for the Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC are to maintain, or where necessary restore, the woodland and the bat sites to good condition so that all of its typical and uncommon species are able to sustain themselves in the long-term as part of a naturally functioning ecosystem[16].
Gogledd Bae Ceredigion/ Northern Cardigan Bay SPA (UK9020327)	Located in the northern half of Cardigan Bay on the west cost of Wales, central NGR SH4942708897. 3.5km west, hydrologically connected via Mawddach Estuary and west towards Barmouth Bay.	82,312.9	**Annex I habitats that are a primary reason for designation:** • Not applicable **Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:**	No high or medium pressures or threats have been identified for this site, however, the following low-level pressures/threats were identified: • Exploration and extraction of oil or gas,	The conservation objective for the Cardigan Bay SPA is to maintain or increase the wintering population of red-throated diver. There should be sufficient habitat, of sufficient quality, to support

[16] Meirionnydd Oakwoods and Bat Sites SAC; Core Management Plan Including Conservation Objectives, April 2008

European Site Name and Code	Location and Distance of European Site from the Project	European Site Size (ha)	Key Features of the European Site	Vulnerability of the European Site	European Site Conservation Objectives
			• Not applicable **Annex I species that are a primary reason for selection of this site:** • Red-throated diver **Annex II species present as a qualifying feature, but not a primary reason for site selection:** • Not applicable	• Marine water pollution; and • Fishing and harvesting aquatic resources.	the population in the long term.
Morfa Harlech a Morfa Dyffryn SAC (UK0030049)	Located in west Wales, Tremadog bay, central NGR SH567328. 7.1km north-west at the closest approach, connected hydrologically along the west coast.	1,059.96	**Annex I habitats that are a primary reason for designation:** Embryonic shifting dunes Shifting dunes along the shoreline with Ammophila arenaria (""white dunes""); Dunes with Salix repens ssp. argentea (Salicion arenariae); and Humid dune slacks **Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:** Not applicable **Annex II species present as a qualifying feature, but not a primary reason for site selection:** Petalwort (*Petalophyllum ralfsii*)	The Natura 2000 site Standard Data Form states that the following threats and pressures have a high impact on the SAC: • Grazing; • Air pollution, air-borne pollutants; • Abiotic (slow) natural processes; • Changes in abiotic conditions; and • Structures, buildings in the landscape.	The conservation objectives for the Morfa Harlech a Morfa Dyffryn SAC will support a broad range of plant community types; from the naturally sparse vegetation of the strandline and the shifting dunes which grade into more fixed and stable dune communities such as the species rich mature dunes slacks and fixed dune grasslands. The mosaic of habitats, including sand dune communities, grasslands, swamp, shingle and scrub which add to the diversity of the site, should be maintained at their present level, or they could decrease in area, if the sand dunes or salt marsh increased. The natural processes which have formed both Morfa Harlech and Morfa Dyffryn sand dune systems, should be allowed to continue unimpeded. Natural debris on the strand line should be left to remain and develop into embryonic shifting dunes. Shifting dunes

European Site Name and Code	Location and Distance of European Site from the Project	European Site Size (ha)	Key Features of the European Site	Vulnerability of the European Site	European Site Conservation Objectives
					along the shoreline should be allowed to develop and erode naturally and the dune slacks should be allowed to form and expand, benefiting from a naturally high-water table. The population of petalwort should be maintained at least at its current level, but where possible increased.

4.2 Pen Llŷn a'r Sarnau /Lleyn Peninsula and the Sarnau SAC

4.2.1 Annex I Habitats

The Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC encompasses areas of sea, coast and estuary that support a wide range of different marine habitats and wildlife. These include sandbanks which are slightly covered by sea water all the time, coastal lagoons, large shallow inlets and bays and reefs. The nature of the seabed and coast and the range of environmental conditions present vary throughout the SAC. Differences in rock and sediment type, aspect, sediment movement, exposure to tidal currents and wave action, water clarity and salinity together with biological and food chain interactions have created a wide range of habitats and associated communities of marine plant and animal species, some of which are unique in Wales. The features are distributed throughout the SAC with no single feature occupying the entire SAC and with features overlapping in some locations. The eastern aspect of the site intersects the SAC, within the Mawddach Estuary.

4.2.1.1 Conservation Objectives

To achieve favourable conservation status, all the Annex I habitats need to be fulfilled and maintained in the long-term (subject to natural processes). If the following objectives are not met restoration measures will be needed to achieve favourable conservation status:

1. The physical, biological and chemical structure and functions necessary for the long-term maintenance and quality of the habitat are not degraded.

Important elements include:

- Geology;
- Sedimentology;
- Geomorphology;
- Hydrography and meteorology;
- Water and sediment chemistry; and
- Biological interactions.

This includes a need for nutrient levels in the water column and sediments to be at or below existing statutory guideline concentrations and within ranges that are not potentially detrimental to the long-term maintenance of the features species populations, their abundance and range.

Contaminant levels in the water column and sediments derived from human activity must be:

- At or below existing statutory guideline concentrations;
- Below levels that would potentially result in increase in contaminant concentrations within sediments or biota; and
- Below levels potentially detrimental to the long-term maintenance of the features species populations, their abundance or range.

For Atlantic saltmeadows, this includes the morphology of the saltmarsh creeks and pans.

2. The presence, abundance, condition and diversity of typical species are such that habitat quality is not degraded.

Important elements include:

- Species richness;
- Population structure and dynamics;

- Physiological heath;
- Reproductive capacity;
- Recruitment;
- Mobility; and
- Range

As part of this objective, it should be noted that populations of typical species subject to existing commercial fisheries need to be at an abundance equal to or greater than that required to achieve maximum sustainable yield and secure in the long term and the management and control of activities or operations likely to adversely affect the habitat feature, is appropriate for maintaining it in favourable condition and is secure in the long term.

Reefs

The overall distribution and extent of reef features within the site, and each of their main component parts is stable or increasing, including:

- Rocky intertidal reefs;
- Rocky subtidal reefs;
- Extensive boulder and cobble reefs – the sarnau;
- Biogenic reefs (horse mussel *Modiolus modiolus* reef / green crenella *Musculus discors* reef and Honeycomb worm *Sabellaria alveolata*) reef; and
- Carbonate reef formed by methane gas leaking from the seabed.

As part of this objective it should be noted that; for the reefs feature the potential for expansion of the horse mussel community off the north Llŷn coast is not inhibited.

Intertidal mudflats and sandflats

The overall distribution and extent of intertidal mudflats and sandflats features within the site, and each of their main component parts is stable or increasing, including:

For the intertidal mudflat and sandflat feature these include:

- Sand gaper (*Mya arenaria*) and polychaetes in muddy gravel;
- Eel grass (*Zostera marina*) beds; and
- Muddy gullies in the Mawddach estuary.

For the intertidal mudflats and sandflats and sandbanks features this requires an overall stability or increase in the amount of the feature, taking into account the areas of long-term stability and localised losses and additions arising from environmental processes.

The sandflats are approximately 25.0km from the site and so are not anticipated to be impacted by the proposed works.

Salicornia

Within the SAC, the Salicornia and other annuals saltmarsh communities are present as a pioneer zone on the marine fringe of saltmarshes in the Glaslyn/Dwyryd, which is directly adjacent to the site. The overall distribution and extent of Salicornia features within the site, and each of their main component parts is stable or increasing, including:

- Communities characterised by the species perennial glasswort (*Sarcocornia perennis*).

Estuaries

For estuaries this includes the stability of sandy sediments in proportion to the muddy sediments.

As part of this objective it should be noted that; for the estuaries feature additional land which should form an integral part of the estuarine ecosystem should be restored and the structure and functions of the estuaries that have been damaged/degraded by the constraints of artificial structures such as flood banks, are restored.

4.2.2 Annex II Species

The Annex II species present within this SAC are bottlenose dolphin, otter and grey seal. The extensive areas of under-boulder spaces provide a habitat for many small animals (such as small crabs and worms) and it is likely that these form an abundant and important food source for larger animals. Aggregations of bottlenose dolphins have been recorded feeding around the sarnau reefs. The estuaries are an important habitat for otters, providing food and access to freshwater. They also appear to be important for bottlenose dolphins with observations that these marine mammals frequent the areas just offshore of the estuary mouths, apparently engaged in feeding. The shingle and rock 'beaches' that form at the back of some of the sea caves are important as seal haul-out and pupping areas in this SAC.

4.2.2.1 Conservation Objectives

The conservation objectives for the habitat features state that the habitat features will be considered to be in favourable conservation status when the following are met for each Annex II species:

The populations of each of the Annex II species are maintaining themselves on a long-term basis as a viable component of their natural habitat. Important elements are population size, structure, production, and condition of the species within the site.

As part of this objective, it should be noted that for bottlenose dolphin, otter and grey seal, contaminant burdens derived from human activity are below levels that may cause physiological damage, or immune or reproductive suppression and grey seal populations should not be reduced as a consequence of human activity.

The species populations within the site are such that the natural range of the populations are not being reduced or likely to be reduced for the foreseeable future.

As part of this objective, it should be noted that for bottlenose dolphin, otter and grey seal, their range within the SAC and adjacent inter-connected areas is not constrained or hindered and there are appropriate and sufficient food resources within the SAC and beyond.

The presence, abundance, condition and diversity of habitats and species required to support this species are such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site are stable or increasing. Important considerations include:

- Distribution;
- Extent;
- Structure;
- Function and quality of habitat; and
- Prey availability and quality.

As part of this objective, it should be noted that;

- The abundance of prey species subject to existing commercial fisheries needs to be equal to or greater than that required to achieve maximum sustainable yield and secure in the long term.
- The management and control of activities or operations likely to adversely affect the species feature, is appropriate for maintaining it in favourable condition and is secure in the long term.
- Contamination of potential prey species should be below concentrations potentially harmful to their physiological health.

4.3 Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC

4.3.1 Annex I Habitats

The Annex I habitats present within the SAC include old sessile oak woods with *Ilex* and *Blechnum*, Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*, watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation, Northern Atlantic wet heaths, European dry heaths, *Tilio-Acerion* forests of slopes, screes and ravines, and bog woodland. These habitat features are distributed throughout the SAC with features overlapping in some locations. The most extensive feature, occupying over 80% of the SAC is the 'sessile oaks feature'. Part of the SAC, Unit 5[15], lies 20m south-east of the site boundary. The habitats within Unit 5 are old sessile oak woods with *Ilex* and *Blechnum*.

4.3.1.1 Conservation Objectives

The conservation objectives for the habitat features state that the habitat features will be considered to be in favourable conservation status when the following are met for each habitat feature:

Woodlands

- The total extent of the woodland area, including woodland canopy and scrub, woodland glades and associated dry heath, bracken and grassland shall be maintained, some 1826 ha in total.
- The location of the different woodland SAC features. The distribution of these woodland communities is largely a reflection of the topography, soils, geology and aspect and is unlikely to change.
- The tree canopy percentage cover within the woodland area for the whole SAC shall be no less than 80%, 87% being the current canopy cover (excepting natural catastrophic events). Some units will have a lower canopy cover which is acceptable provided this is compatible with safeguard of the habitat, features and special interest.
- The canopy and shrub layer comprises locally native species.
- There shall be sufficient natural regeneration of locally native trees and shrubs to maintain the woodland canopy and shrub layer, by filling gaps and allowing the recruitment of young trees and encouraging a varied age structure.
- The typical ground layer species of each woodland SAC feature will be common. It is important for most of the woodland SAC that the vegetation does not becomes rank and overgrown with a height above 40cm and/or dominated by species such as bramble (*Rubus fruticosus*), ivy (*Hedera helix*) and young holly (*Ilex aquifolium*). Limits may be set on a unit or compartment basis. Unit 5 is currently described as requiring grazing rates to be set on a compartment basis, being increased or decreased. Grazing may also needre-introducing in some areas[14].
- The abundance and distribution of common and typical (Atlantic, sub-Atlantic, western, oceanic) mosses and liverworts, lichens (and slime moulds), will be maintained or increased.
- The abundance and distribution of uncommon mosses and liverworts, lichens, and slime moulds, will be maintained or increased.
- There will be a scattering of 5 mature trees per hectare within the existing tree canopy or parkland, that is trees of approximately 60cm diameter plus for oak (*Quercus robur*) and ash (*Fraxinus excelsior*) and/or with signs of decay, holes etc. In the longer-term, by 2060 there should be 1 veteran trees per hectare that is trees of at least 100cm diameter for oak and ash, also at least 75cm birch.
- The volume of dead wood will exceed 30 cubic metres per hectare throughout and consist of a mixture of fallen trees (minimum 1 per hectare), broken branches, dead branches on live trees, and standing dead trees (minimum 1 per hectare). Volumes of deadwood are currently at relatively low levels because the woodlands, in general, have an even-age structure and lack mature trees and any quantity of deadwood because of past silvicultural management. Some lower plants are dead wood specialists but these woodlands tend to lack the rare dead wood invertebrate assemblage found in other parts of the UK.

- Invasive non-native species such as rhododendron, Japanese knotweed and Himalayan balsam (*Impatiens glandulifera*) will not be present. Rhododendrons are an issue within Unit 5 that would need to be addressed[14].
- All factors affecting the achievement of these conditions are under control.

European dry heaths

- The total extent of the dry heath area, approximately 21 ha, shall be maintained.
- The distribution of the dry heath will be maintained.
- The typical and uncommon species of the vegetation communities comprising the dry heath will be frequent and abundant.
- The structure of the heath should be maintained and restored, to show natural regeneration by layering and seeding, and to ensure that the component vegetation communities are naturally diverse.
- Invasive non-native species such as conifers, rhododendron, Japanese knotweed and Himalayan balsam will not be present.
- The heath will be generally free from trees and at most have only a few individuals at a density of no more than 2 per hectare. Exceptions to this rule are transition zones from woodland to heath land where trees may be denser grading to open heath. Limits for woodland transition zones should be set on a unit or sub-unit basis.
- All factors affecting the achievement of these conditions are under control.

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho Batrachion vegetation

- The extent of suitable river habitat within which the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation can occur should be stable.
- The current distribution (not known) of the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation should be stable or increasing.
- The river with floating vegetation may be dominated by water crowfoot species usually *Ranunculus fluitans*, (but this species is not recorded in Meirionnydd), *Callitriche stagnalis* and bryophytes.
- Species indicative of unfavourable condition for this feature e.g. filamentous algae associated with eutrophication and invasive non-native species, should be absent or below an acceptable threshold level, indicative of high ecological status, within the SAC. This attribute is considered further under factors.
- All factors affecting the achievement of these factors are under control.

4.3.2 Annex II Species

The Annex II species present within SAC are the lesser horseshoe bat. This large composite site includes most of the known maternity roosts in Meirionnydd and some hibernation roosts and comprises the centre of distribution for lesser horseshoe bats in Wales. The sheltered river valleys provide excellent tree cover and numerous suitable maternity roosts.

4.3.2.1 Conservation Objectives

The conservation objectives for lesser horseshoe bats state that they will be considered to be in favourable conservation status when the following conditions are met for each:

- The population of lesser horseshoe bats should be maintained at its current size and encouraged where possible to increase.

- There are sufficient breeding roosts (buildings, structures and trees) and hibernation roosts (mines and buildings) of appropriate quality. The other types of roost such as night, transitional, leks and swarming sites, should also be maintained as knowledge of these (often significant) roosts improves.
- Foraging or feeding habitat in the SAC and surrounding countryside, including grasslands and some gardens, is of appropriate quality, extent and connectivity across the range.
- The range of the population within the SAC/Gwynedd is stable or increasing.
- All factors affecting the achievement of these conditions are under control.

4.4 Northern Cardigan Bay SPA

4.4.1 Annex I Species

The single qualifying feature of the SPA is the nationally important non-breeding population of Red-throated diver, representing 7% of the wintering population in Great Britain.

4.4.1.1 Conservation Objectives

To achieve favourable conservation status all the following, subject to natural processes, need to be fulfilled and maintained in the long-term. If these objectives are not met restoration measures will be needed to achieve favourable conservation status:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long-term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long-term.

Supporting habitats for the bird species of the Northern Cardigan SPA includes the sarnau reefs of Northern Cardigan Bay.

4.5 Morfa Harlech a Morfa Dyffryn SAC

4.5.1 Annex I Habitats

The Morfa Harlech a Morfa Dyffryn SAC covers two sand dune systems, Morfa Harlech to the north and Morfa Dyffryn to the south. Morfa Harlech is a rapidly accreting dune system gaining sand from the coast to the south including the dune system at Morfa Dyffryn, which is eroding. The Morfa Harlech a Morfa Dyffryn SAC supports the following SAC features: embryonic shifting dunes; shifting dunes along the shoreline with *Ammophila arenaria* (‘white dunes’); humid dune slacks; dunes with *Salix repens* ssp. argentea (*Salicion arinarea*); and petalwort.

4.5.1.1 Conservation Objectives

Embryonic shifting dunes

These are located within unit 2, Morfa Harlech which is approximately 4km south of the site. The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- The total extent of the embryonic shifting dunes including those areas that are considered unfavourable or currently degraded is maintained at the area present when designated.
- The strand line and embryonic dune vegetation should be made up of typical species as detailed in the management plan.
- All factors affecting the achievement of these conditions are under control.

***Shifting dunes along the shoreline with* Ammophila**

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- The total extent of the shifting dunes including those areas that are considered unfavourable or currently degraded is maintained at the area present when designated, c.18.9 ha at Morfa Harlech which should be present both along the seaward dune ridge and inland within Units 1, 3, 4 and 5 and at least 82 ha of shifting dunes at Morfa Dyffryn which should be distributed throughout Units 28, 27, 26, 24, and 23. Of these, unit 4 is closest to the site, at approximately 6km south of the site in Morfa Harlech. Morfa Dyffryn lies further to the south at approximately 13km south of the site.
- The shifting dunes should be vegetated by species such as *Elytrigia juncea* (*Elymus farctus*), *Festuca rubra*, *Senicio jacobaea*, *Hypochoeris radicata Euphorbia paralias*, and *Carex arenaria*.
- All factors affecting the achievement of these conditions are under control.

***Humid dune slacks and dunes with* Salix repens**

The vision for these features is for them to be in a favourable conservation status, where all of the following conditions are satisfied:

- The total extent of the humid dune slacks and dunes with creeping willow (*Salix repens*) including those areas that are considered unfavourable or currently degraded is maintained at the area present when designated, some 65.1 ha at Morfa Harlech and 43.6 ha at Morfa Dyffryn.
- All successional phases of dune slack vegetation should be present at Morfa Dyffryn.
- The humid dune slacks should be vegetated with typical and desirable species such as those outlined in management plan.
- The dune slack vegetation should be free from scrub and should have a relatively short sward.
- All factors affecting the achievement of these conditions are under control.

Petalwort (*Petalophyllum ralfsii*)

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- The population of Petalophyllum will remain stable or increase.
- Petalophyllum should be present at Morfa Harlech should be distributed across the northern part of Morfa Dyffryn sand dune system (Units 26 and 28).
- The successionally young dune slacks that support the Petalophyllum should be in good condition as defined in the conservation objective for features 3 and 4 above.
- All factors affecting the achievement of these conditions are under control.

4.5.2 Annex II Species

The Annex II species present within this SAC is petalwort. This species is found within the humid dune slacks and dunes with Salix repens. It is found most often within the successionally young dune slacks.

4.5.2.1 Conservation Objectives

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- The population of petalwort will remain stable or increase.
- Petalwort should be present at Morfa Harlech should be distributed across the northern part of Morfa Dyffryn sand dune system (Units 26 and 28) which are approximately 13km south of the site at their closest point.

- The successionally young dune slacks that support the petalwort should be in good condition as defined in the conservation objective for Humid Dune Slakcs and Dunes with Salix repens above.
- All factors affecting the achievement of these conditions are under control.

5. Screening Assessment

5.1 Potential Effects of the Project

During construction, there is predicted to be a potential pathway for effect on the European Sites identified in Section 4 above. The potential pathways for effects on the sites could be present in the form of:

- Habitat degradation through water pollution or sedimentation;
- Habitat loss directly through construction works;
- Loss of habitat used by Annex I and Annex II species;
- Physical disturbance of habitats used by Annex I and Annex II species;
- Disturbance/displacement of faunal species, extending to but not limited to lesser horseshoe bats and bat roosts, otter, and grey seal, bottlenose dolphin and red-throated divers; and
- Human-induced changes in hydraulic conditions.
- These potential effect pathways are considered in more detail under the relevant headings below, with the results of the screening assessment summarised in Section 5.3.

5.1.1 Effects during construction

5.1.1.1 Water Pollution including sedimentation

In the absence of any avoidance and/or mitigation measures, there is the potential for construction activities to result in a pollution incident (for example, from increased sedimentation working within and around the watercourses including from physical disturbance of habitats by construction vehicles) which could affect the Pen Llŷn a'r Sarnau /Lleyn Peninsula and the Sarnau SAC as it lies within the site boundary. The potential for water pollution could also affect Morfa Harlech a Morfa Dyffryn SAC, Northern Cardigan Bay SPA as they are hydrologically connected downstream. The Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC situated 20m south-east of the site boundary may be affected by sedimentation from settlement of suspended dust particles during construction phase.

5.1.1.2 Habitat loss directly through construction works

Habitat loss is highly likely to occur during the construction phase of the proposed works, particularly within the Pen Llŷn a'r Sarnau /Lleyn Peninsula and the Sarnau SAC where the sea wall is being repaired adjacent to a mosaic of intertidal habitats. The extent of habitat loss is dependent on design decisions. Sensitive consideration to intertidal features should be observed during detailed design and integration of mitigation and enhancement measures.

5.1.1.3 Loss of habitat used by Annex I and Annex II species

There is potential for the loss of key habitat that is used by Annex II species within the Pen Llŷn a'r au/ Lleyn Peninsula and the Sarnau SAC, such as the reefs and estuaries used by otter, bottlenose dolphins and seals. There is also potential for effect on the habitats of the red-throated diver which are found at the sarnau reefs of Northern Cardigan Bay SPA.

5.1.1.4 Physical disturbance of habitats used by Annex I and Annex II species

Works within the site have the potential to reduce the size or quality of foraging and commuting habitat used by Annex II species, lesser horseshoe bats and otter, for example through air pollution, dust settlement and noise pollution from works that are carried out in close proximity. There is also potential for indirect disturbance to structures that may be used by roosting bats through noise pollution or dust due to the construction. There is also the potential for physical disturbance to Morfa Harlech a Morfa Dyffryn SAC dune slacks which support petalwort and the sarnau reefs of Northern Cardigan Bay which support red-throated diver.

5.1.1.5 Disturbance/Displacement to faunal species

Disturbance to faunal species has the potential to arise from construction noise, vibration and dust (for example, during movement of machinery around the site) due to the overlap between the project and the Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau SAC boundary. Depending on the works, this could lead to disturbance of otter, grey seal and bottlenose dolphin. The Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC boundary is in close proximity to the project and may also be affected.

5.1.1.6 Human-induced changes in hydraulic conditions

There is potential for temporary changes in hydraulic conditions, depending on the scope of works, for example through the use of erecting temporary barriers, dewatering works or channelling. This could impact Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau SAC, Morf Harlech a Morfa Dyffryn SAC and Northern Cardigan SPA which would impact the habitats and species of these European sites.

5.1.2 Effects during operation

5.1.2.1 Human-induced changes in hydraulic conditions

In the absence of any specific designs to avoidance and reduce potential effects and/or mitigation measures there is potential for the proposed works to affect the hydraulic conditions of the estuary within the Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC. Annex I habitats that may be subject to these negative effects include estuaries and intertidal mudflats and sandflats. Annex II species that may be subject to these negative effects include grey seal, otter and bottlenose dolphin. Northern Cardigan Bay SPA and Morfa Harlech a Morfa Dyffryn SAC are hydrologically connected and may potentially be affected.

5.2 Identification of Other Plans and Projects

Multiple planning applications were identified near the project (within a 500m radius form the project boundary[17]). Of these the following were considered significant:

- C22/0057/00/CR – Application for the upgrading and replacement works on steel components of Barmouth Bridge, situated east of the proposed Viaduct Gardens site.
- C22/0303/00/DT – Application for the construction of two dormer windows, requiring alterations to a roof of a building.

Other planning is not considered likely to impact on the two SACs within 500m of the Site due to their small size or location away from the SACs and lack of hydrological connectivity. This is correct at the time of writing (3rd May 2022).

5.3 Consideration of Effects and Significance

The Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau SAC will need to be taken forward for further assessment, within an Appropriate Assessment, due to potential impacts on the hydraulic conditions within the Annex I habitats and the impacts on potentials foraging habitats for the Annex II species, namely otter, but could include bottlenose dolphin and grey seal. The Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC will also be taken forward for further assessment due to the potential pathway for effect arising from the close proximity between the Site and the boundaries of the SAC, in addition to impacts on potential foraging and commuting habitats for lesser horseshoe bats. Morfa Harlech a Morfa Dyffryn SAC and Northern Cardigan Bay SPA, due to their hydrological connectivity downstream and potential effects relating to construction and operational impacts, will also be taken forward into Appropriate Assessment stge.

[17] This search radius may need to be extended for future studies depending upon the scope of works

For the purposes of this assessment, it is concluded that in the absence of mitigation and where pathways for effects are present, there is the potential to cause significant effects and therefore an Appropriate Assessment is required for the site.

These potential effects are summarised in Table 2 and in subsequent sections. There is not predicted to be an operational effect on any European Site as all conditions will remain as per the existing site.

Table 2: Potential construction effects of the project on the European Sites and their features

Potential Effect	Features of European Site						
	Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC		**Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites SAC**		**Northern Cardigan Bay SPA**	**Morfa Harlech a Morfa Dyffryn SAC**	
	Annex I habitats	Annex II species	Annex II habitats	Annex II species	Annex I species	Annex I habitats	Annex II species
Water pollution/ sedimentation	Pathway for effect	Pathway for effect	Pathway for effect	Pathway for effect	Pathway for effect	Pathway for effect	Pathway for effect
Habitat loss directly through construction works	Pathway for effect	Pathway for effect	N/A	N/A	N/A	N/A	N/A
Loss of habitat used by Annex I and Annex II species	Pathway for effect	Pathway for effect	N/A	N/A	Pathway for effect	Pathway for effect	Pathway for effect
Physical disturbance of habitats used by Annex I and Annex II species	Pathway for effect	Pathway for effect	N/A	N/A	Pathway for effect	Pathway for effect	Pathway for effect
Disturbance/ Displacement to faunal species	N/A	Pathway for effect	N/A	Pathway for effect	N/A	N/A	N/A
Human-induced changes in hydraulic conditions	Pathway for effect	Pathway for effect	N/A	N/A	Pathway for effect	Pathway for effect	Pathway for effect

6. Recommendations

6.1 Species-specific surveys

Further details regarding the scope and detailed location of the works are required to inform any Ecological Impact Assessment (EcIA) and HRA. With the current extent of the design as detailed in the PEA[4], due to the urban nature of the current site boundary, no protected species surveys have been recommended as yet. The requirement for species-specific surveys is subject to change as the detailed design of the proposed works is developed and will be kept under review.

6.2 General Mitigation During Construction

General mitigation principles and guidance should be adhered to throughout any of the stages of the proposed construction works. Listed below are some of these general mitigation considerations, this is not an exhaustive list and should be reviewed and updated when consultations and designs are known and further surveys are completed (if applicable). These general mitigation considerations should be detailed within an Environmental Action Plan (EAP) and updated during the construction phase of the scheme.

- Prior to works commencing all plant should be cleaned before they enter the estuarine area / water edge for biosecurity and pollution prevention. All operatives should be given a toolbox talk on all ecological constraints on site and works within watercourse restricted to avoid fish spawning times. The contractor should carry out daily checks on all plant items for fluid losses (Engine / Hydraulic Oils and diesel leaks).
- Implementation of sediment management measures on site, these may include biodegradable erosion control on the channel banks and sediment trapping devices placed in river channel downstream of working areas.
- All works should be undertaken in accordance with Guidance for Pollution Prevention GPP5 and PPG1 Understanding your Environmental Responsibilities.
- Silt mitigation to be setup on the bank of the watercourse beyond the proposed works. This shall include a settlement tank, silt sock, silt fencing and straw bales. Once installed it should be inspected by the Site Foreman before to ensure that it is adequate to prevent any sediment from entering the water course. In accordance with GPP5 and PPG1.
- Refuelling of all plant and equipment should be carried out away from the watercourse (at least 10m). On completion of the pipeline the banks of the watercourse will be reinstated in accordance with the required specification.
- If any protected species are encountered during the works, all work in the vicinity should stop immediately and a suitably qualified ecologist contacted for advice on how to proceed.

An updated HRA will be required once the scope and detailed location of the works are known and species-specific surveys have been completed (if applicable). This will likely need to be a stage 2 appropriate assessment which will include mitigation measures (building on the preliminary list of measures as above).

7. Conclusions

This project's primary aim is to reduce coastal flood risk to the community of Barmouth.

Four European Sites were identified, of which two are within 2km of the site. Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau SAC lies partially within the site and Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC is adjacent to the site. Morfa Harlech a Morfa Dyffryn SAC and Cardigan Bay SPA are downstream hydrologically connected to the site. A number of qualifying Annex I habitats and Annex I and Annex II species, including a lesser horseshoe bat, bottlenose dolphin, otter, grey seal and red-throated diver, have the potential to be impacted by the project.

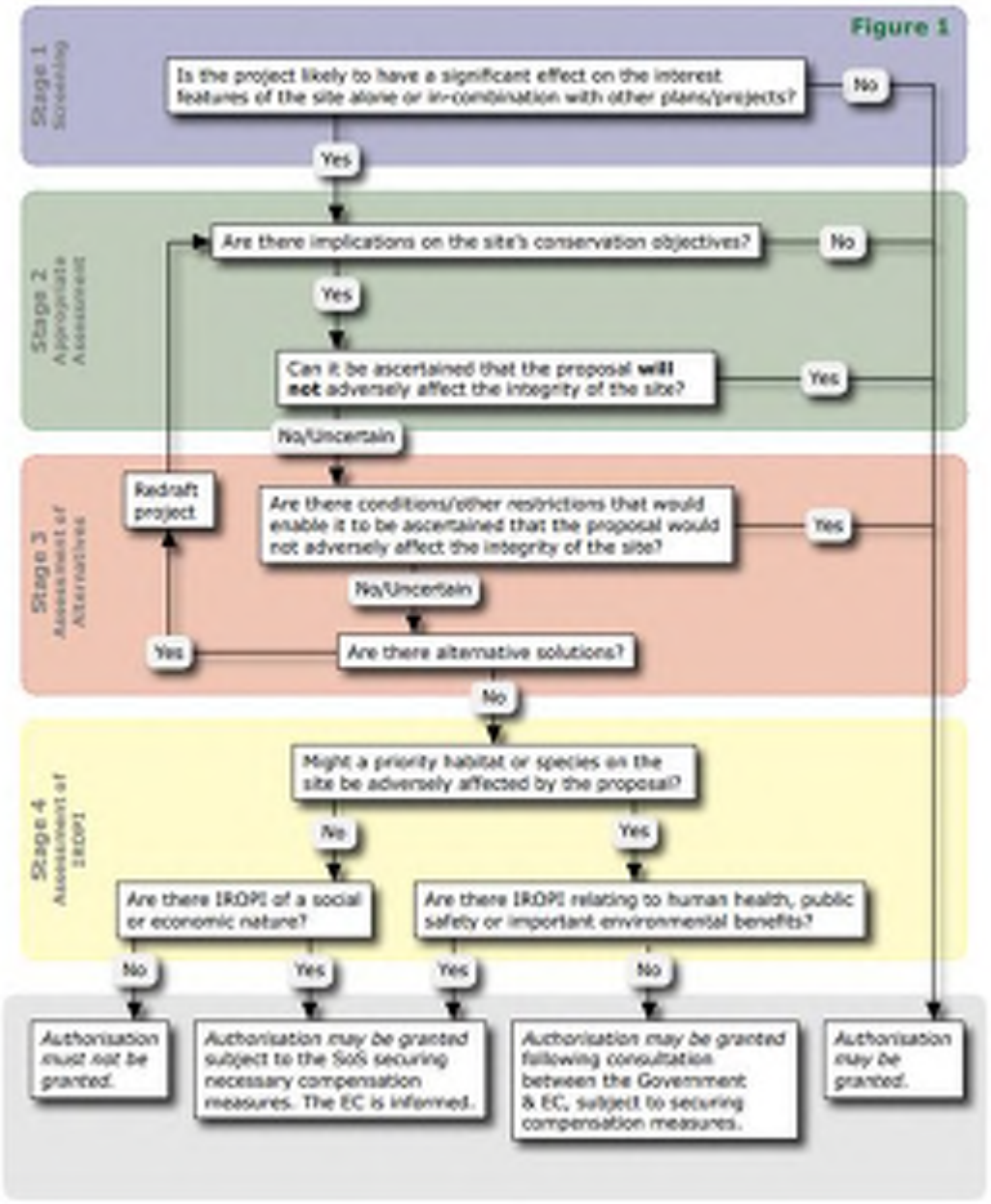
Potential pathways for effects exist for: habitat degradation of Annex I habitats in the form of pollution and sedimentation; habitat loss directly through construction works; loss of habitat used by Annex I and Annex II species; physical habitat disturbance of Annex I habitats as well as those that support Annex I and Annex II species including but not limited to, red-throated diver, lesser horseshoe bats, otter and grey seal; and human-induced hydraulic condition changes that could affect both Annex I habitats and Annex I and Annex II species.

The report considers the potential effects on the designated sites in relation to the Conservation Objectives for the features of the European Site and identified potential pathways for effect. Without specific designs to avoid impacts and/or mitigation measures, the proposed works present the likelihood of the project having a significant effect on European Sites and/or their features. It is therefore advised that a Stage 2 Appropriate Assessment is carried out, following development of the scope of works.

This report is produced solely for the benefit of Ymgynghoriaeth Gwynedd Consultancy - Gwynedd Council and no liability is accepted for any reliance placed on it by any other party. This report is prepared for the proposed uses stated in the report and should not be used in a different context.

Appendix A

A.1 Habitat Regulations Assessment[18]

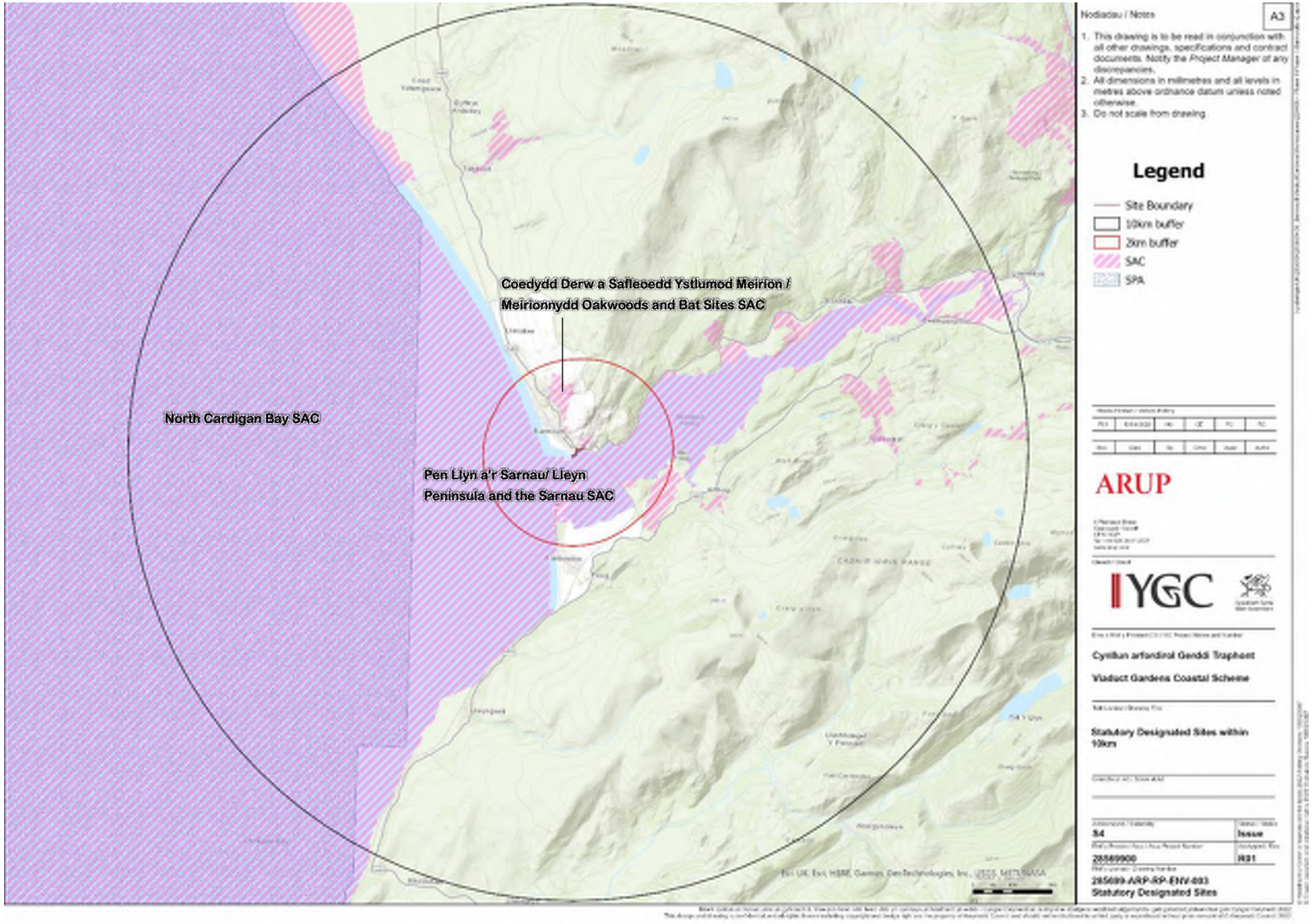


[18] Copied from: The Planning Inspectorate, 2013. Habitat Regulations Assessment for nationally significant infrastructure projects. Version 4, January.

Appendix B

Designated Sites

B.1 European Sites within 10km of the Site



B.2 Natura 2000 Standard Data Forms for European Sites

STANDARD DATA FORM for sites within the ‘UK national site network of European sites’

Special Protection Areas (SPAs) are classified and Special Areas of Conservation (SACs) are designated under:

- the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales (including the adjacent territorial sea) and to a limited extent in Scotland (reserved matters) and Northern Ireland (excepted matters);
- the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) in Scotland;
- the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended) in Northern Ireland; and
- the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) in the UK offshore area.

Each SAC or SPA (forming part of the UK national site network of European sites) has its own Standard Data Form containing site-specific information. The information provided here generally follows the same documenting format for SACs and SPAs, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

More general information on SPAs and SACs in the UK is available from the SPA homepage and SAC homepage on the JNCC website. These webpages also provide links to Standard Data Forms for all SAC and SPA sites in the UK.

https://jncc.gov.uk/

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK0013117**

SITENAME **Pen Lln a`r Sarnau/ Lleyn Peninsula and the Sarnau**

TABLE OF CONTENTS

- 1. SITE IDENTIFICATION
- 2. SITE LOCATION
- 3. ECOLOGICAL INFORMATION
- 4. SITE DESCRIPTION
- 5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES
- 6. SITE MANAGEMENT

1. SITE IDENTIFICATION

Back to top

1.1 Type	1.2 Site code
B	UK0013117

1.3 Site name

Pen Lln a`r Sarnau/ Lleyn Peninsula and the Sarnau

1.4 First Compilation date	1.5 Update date
1996-01	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	1996-01
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2004-12
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

Back to top

2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-4.366388889	52.69138889

2.2 Area [ha]:

146010.52

2.3 Marine area [%]

98.8

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKZZ	Extra-Regio
UKL2	East Wales
UKL1	West Wales and The Valleys

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

Back to top

3.1 Habitat types present on the site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
1110			10658.77	0	G	B	C	A	B
1130			4526.33	0	G	B	C	A	B
1140			3358.24	0	G	C	C	B	C
1150	X		73.01	0	G	C	C	B	B
1160			41320.98	0	G	B	B	A	B
1170			33436.41	0	G	B	B	A	B
1310			146.01	0	G	C	B	C	C
1320									

			0.0	0	G	D			
1330			730.05	0	G	B	B	B	C
8330			146.01	0	G	C	C	A	C

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
F	1102	Alosa alosa			p				P	DD	D			
F	1103	Alosa fallax			p				P	DD	D			
M	1364	Halichoerus grypus			p	101	250	i		M	C	B	B	C
F	1099	Lampetra fluviatilis			p				P	DD	D			
M	1355	Lutra lutra			p				P	DD	C	B	C	C
F	1095	Petromyzon marinus			p				P	DD	D			
M	1351	Phocoena phocoena			p				P	DD	D			
M	1349	Tursiops truncatus			p				P	DD	C	B	C	C

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

Back to top

4.1 General site character

Habitat class	% Cover
N05	0.2
N07	0.1
N03	1.2
N04	0.5
N01	92.6
N02	5.4
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: sand,sedimentary,shingle,clay,igneous,metamorphic,mud 2 Terrestrial: Geomorphology and landscape: caves,coastal,island,floodplain 3 Marine: Geology: metamorphic,sedimentary,igneous,mud,gravel,cobble,biogenic reef,sand,pebble,maerl,boulder,clay,peat,slate/shale 4 Marine: Geomorphology: open coast (including bay),cliffs,estuary,lagoon,surge gullies,subtidal sediments (including sandbank/mudbank),subtidal rock (including rocky reefs),sound/strait,islands,intertidal sediments (including sandflat/mudflat),intertidal rock,cave/tunnel,basins

4.2 Quality and importance

Sandbanks which are slightly covered by sea water all the time for which this is considered to be one of the best areas in the United Kingdom. Estuaries for which this is considered to be one of the best areas in the United Kingdom. Mudflats and sandflats not covered by seawater at low tide for which the area is considered to support a significant presence. Coastal lagoons for which this is considered to be one of the best areas in the United Kingdom. Large shallow inlets and bays for which this is considered to be one of the best areas in the United Kingdom. Reefs for which this is considered to be one of the best areas in the United Kingdom. Submerged or partially submerged sea caves for which the area is considered to support a significant presence. Salicornia and other annuals colonising mud and sand for which the area is considered to support a significant presence. Atlantic salt meadows (Glauco-Puccinellietalia maritimae) for which the area is considered to support a significant presence. Lutra lutra for which the area is considered to support a significant presence. Halichoerus grypus for which the area is considered to support a significant presence. Tursiops truncatus for which the area is considered to support a significant presence.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
M	H01		B
H	A04		I
M	H03		B
H	I01		B
H	J02		B
H	F02		B
M	M01		B
H	G05		I
M	B02		B
M	G01		B
M	H02		B

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
M	G01		I
M	D01		I
M	G03		B
M	A04		B
M	G02		I

Rank: H = high, M = medium, L = low

Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification, T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions

i = inside, o = outside, b = both

4.5 Documentation

The Natural Resources Wales weblink below provides access to information on its designated sites. Detailed information about this Natura 2000 site can be accessed via the Management Plan link provided in Section 6.2. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-lan

http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

Back to top

5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	4.6	UK01	1.6	UK00	95.4

6. SITE MANAGEMENT

Back to top

6.1 Body(ies) responsible for the site management:

Organisation:	Natural Resources Wales
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

- [X] Yes — Name: PEN LLYN A'R SARNAU / LLEYN PENINSULA AND THE SARNAU
  Link: https://www.naturalresources.wales/media/673816/Pen%20Llyn%20ar%20Sarnau%20%20R33%20Feb%202009.pdf
- [ ] No, but in preparation
- [ ] No

EXPLANATION OF CODES USED IN THE SPECIAL AREA OF CONSERVATION (SAC) AND SPECIAL PROTECTION AREA (SPA) STANDARD DATA FORMS

The codes in the table below generally follow those explained in the official European Union guidelines for the Standard Data Form (also referencing the relevant page number).

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	SPA (classified Special Protection Area)	53
B	cSAC, SCI or SAC (candidate Special Area of Conservation, Site of Community Importance, designated Special Area of Conservation)	53
C	SPA area/boundary is the same as the cSAC/SCI/SAC i.e. a co-classified/designated site (Note: this situation only occurs in Gibraltar)	53

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha• rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Habitat representativity (abbreviated to 'Representativity' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent representatively	57
B	Good representatively	57
C	Significant representatively	57
D	Non-significant presence representatively	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	58
B	> 2%-15%	58
C	≤ 2%	58

3.1 Degree of conservation (abbreviated to 'Conservation' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global assessment (abbreviated to 'Global' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	62
B	> 2%-15%	62
C	≤ 2%	62
D	Non-significant population	62

3.2 Degree of conservation (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Other species – essentially covers bird assemblage types

CODE	DESCRIPTION	PAGE NO
WATR	Non-breeding waterbird assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code

BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK04	Site of Special Scientific Interest (GB)	67
UK05	Marine Conservation Zone	67
UK06	Nature Conservation Marine Protected Area	67
UK86	Special Area (Channel Islands)	67
UK98	Area of Special Scientific Interest (NI)	67
IN00	Ramsar Convention site	67
IN08	Special Protection Area	67
IN09	Special Area of Conservation	67

STANDARD DATA FORM for sites within the ‘UK national site network of European sites’

Special Protection Areas (SPAs) are classified and Special Areas of Conservation (SACs) are designated under:

- the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales (including the adjacent territorial sea) and to a limited extent in Scotland (reserved matters) and Northern Ireland (excepted matters);
- the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) in Scotland;
- the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended) in Northern Ireland; and
- the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) in the UK offshore area.

Each SAC or SPA (forming part of the UK national site network of European sites) has its own Standard Data Form containing site-specific information. The information provided here generally follows the same documenting format for SACs and SPAs, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

More general information on SPAs and SACs in the UK is available from the SPA homepage and SAC homepage on the JNCC website. These webpages also provide links to Standard Data Forms for all SAC and SPA sites in the UK.

https://jncc.gov.uk/

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK0014789**

SITENAME **Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites**

TABLE OF CONTENTS

- 1. SITE IDENTIFICATION
- 2. SITE LOCATION
- 3. ECOLOGICAL INFORMATION
- 4. SITE DESCRIPTION
- 5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES
- 6. SITE MANAGEMENT

1. SITE IDENTIFICATION

Back to top

1.1 Type	1.2 Site code
B	UK0014789

1.3 Site name

Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites

1.4 First Compilation date	1.5 Update date
1995-06	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	1995-06
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2004-12
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

Back to top

2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-3.898888889	52.795

2.2 Area [ha]:

2812.79

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKL1	West Wales and The Valleys

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

Back to top

3.1 Habitat types present on the site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
3260			28.13	0	M	B	C	B	C
4010			2.81	0	G	C	C	C	C
4030			22.5	0	G	C	C	C	C
9180	X		14.06	0	G	C	C	C	C
91A0			2337.43	0	G	A	C	B	A
91D0	X		5.63	0	G	C	C	B	C
91E0	X		73.13	0	G	B	B	B	B

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)

- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
M	1355	Lutra lutra			p				P	DD	D			
M	1303	Rhinolophus hipposideros			p	1001	10000	i		M	A	B	C	A
F	1106	Salmo salar			p				P	DD	D			

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

Back to top

4.1 General site character

Habitat class	% Cover
N23	1.0
N14	0.1
N16	93.9
N07	0.1
N19	2.0
N06	2.0
N08	0.9
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: metamorphic,sedimentary,sandstone,neutral,acidic,nutrient-poor 2 Terrestrial: Geomorphology and landscape: upland,slope,lowland,hilly,valley

4.2 Quality and importance

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation for which the area is considered to support a significant presence. Northern Atlantic wet heaths with Erica tetralix for which the area is considered to support a significant presence. European dry heaths for which the area is considered to support a significant presence. Tilio-Acerion forests of slopes, screes and ravines for which the area is considered to support a significant presence. Old sessile oak woods with Ilex and Blechnum in the British Isles for which this is considered to be one of the best areas in the United Kingdom. Bog woodland for which the area is considered to support a significant presence. which is considered to be rare as its total extent in the United Kingdom is estimated to be less than 1000 hectares. Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) for which this is considered to be one of the best areas in the United Kingdom. Rhinolophus hipposideros for which this is considered to be one of the best areas in the United Kingdom.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
M	K04		B
M	G01		B
H	I01		B
M	B07		I
H	H01		B
H	H04		B
L	K02		B
M	E06		I
H	A04		I

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
M	A10		I
M	D05		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

The Natural Resources Wales weblink below provides access to information on its designated sites. Detailed information about this Natura 2000 site can be accessed via the Management Plan link provided in Section 6.2. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-lan

http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

Back to top

5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK01	11.8	UK04	91.0		

6. SITE MANAGEMENT

Back to top

6.1 Body(ies) responsible for the site management:

Organisation:	Natural Resources Wales
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

X	Yes	Name: COEDYDD DERW A SAFLEOEDD YSTLUMOD MEIRION / MEIRIONNYDD OAKWOODS AND BAT SITES Link: https://www.naturalresources.wales/media/672832/MOW%20SAC%20Plan%2017-4-08.pdf
	No, but in preparation	
	No	

EXPLANATION OF CODES USED IN THE SPECIAL AREA OF CONSERVATION (SAC) AND SPECIAL PROTECTION AREA (SPA) STANDARD DATA FORMS

The codes in the table below generally follow those explained in the official European Union guidelines for the Standard Data Form (also referencing the relevant page number).

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	SPA (classified Special Protection Area)	53
B	cSAC, SCI or SAC (candidate Special Area of Conservation, Site of Community Importance, designated Special Area of Conservation)	53
C	SPA area/boundary is the same as the cSAC/SCI/SAC i.e. a co-classified/designated site (Note: this situation only occurs in Gibraltar)	53

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha• rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Habitat representativity (abbreviated to 'Representativity' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent representatively	57
B	Good representatively	57
C	Significant representatively	57
D	Non-significant presence representatively	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	58
B	> 2%-15%	58
C	≤ 2%	58

3.1 Degree of conservation (abbreviated to 'Conservation' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global assessment (abbreviated to 'Global' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	62
B	> 2%-15%	62
C	≤ 2%	62
D	Non-significant population	62

3.2 Degree of conservation (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Other species – essentially covers bird assemblage types

CODE	DESCRIPTION	PAGE NO
WATR	Non-breeding waterbird assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code

BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK04	Site of Special Scientific Interest (GB)	67
UK05	Marine Conservation Zone	67
UK06	Nature Conservation Marine Protected Area	67
UK86	Special Area (Channel Islands)	67
UK98	Area of Special Scientific Interest (NI)	67
IN00	Ramsar Convention site	67
IN08	Special Protection Area	67
IN09	Special Area of Conservation	67

STANDARD DATA FORM for sites within the ‘UK national site network of European sites’

Special Protection Areas (SPAs) are classified and Special Areas of Conservation (SACs) are designated under:

- the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales (including the adjacent territorial sea) and to a limited extent in Scotland (reserved matters) and Northern Ireland (excepted matters);
- the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) in Scotland;
- the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended) in Northern Ireland; and
- the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) in the UK offshore area.

Each SAC or SPA (forming part of the UK national site network of European sites) has its own Standard Data Form containing site-specific information. The information provided here generally follows the same documenting format for SACs and SPAs, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

More general information on SPAs and SACs in the UK is available from the SPA homepage and SAC homepage on the JNCC website. These webpages also provide links to Standard Data Forms for all SAC and SPA sites in the UK.

https://jncc.gov.uk/

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK0030049**

SITENAME **Morfa Harlech a Morfa Dyffryn**

TABLE OF CONTENTS

- 1. SITE IDENTIFICATION
- 2. SITE LOCATION
- 3. ECOLOGICAL INFORMATION
- 4. SITE DESCRIPTION
- 5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES
- 6. SITE MANAGEMENT

1. SITE IDENTIFICATION

Back to top

1.1 Type	1.2 Site code
B	UK0030049

1.3 Site name

Morfa Harlech a Morfa Dyffryn

1.4 First Compilation date	1.5 Update date
1998-03	2015-12

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY

Email:

Date site proposed as SCI:	1998-03
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2004-12
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

Back to top

2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
-4.129166667	52.87333333

2.2 Area [ha]:

1059.96

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKL1	West Wales and The Valleys

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

Back to top

3.1 Habitat types present on the site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
2110			6.36	0	G	A	B	A	A
2120			127.2	0	G	A	B	A	A
2170			42.4	0	M	A	B	B	B
2190			53.0	0	M	A	B	B	B

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive

92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
P	1395	Petalophyllum ralfsii			p				P	DD	C	B	C	B
A	1166	Triturus cristatus			p				P	DD	D			

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

Back to top

4.1 General site character

Habitat class	% Cover
N10	2.0
N08	1.0
N19	1.0
N04	66.0
N03	30.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: sand,mud,shingle,neutral 2 Terrestrial: Geomorphology and landscape: lowland,coastal

4.2 Quality and importance

Embryonic shifting dunes for which this is considered to be one of the best areas in the United Kingdom. which is considered to be rare as its total extent in the United Kingdom is estimated to be less than 1000 hectares. Shifting dunes along the shoreline with Ammophila arenaria (?white dunes?) for which this is considered to be one of the best areas in the United Kingdom. Dunes with Salix repens ssp. argentea (Salicion arenariae) for which this is considered to be one of the best areas in the United Kingdom. which is considered to be rare as its total extent in the United Kingdom is estimated to be less than 1000 hectares. Humid dune slacks for which this is considered to be one of the best areas in the United Kingdom. Petalophyllum ralfsii for which this is considered to be one of the best areas in the United Kingdom.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	A04		I
M	G01		I
L	H02		B
H	H04		B
M	J02		B
H	K01		B
M	B02		I
L	H05		I
L	I01		B
M	I02		B
M	J03		B
M	K02		B
H	M01		B
H	E04		B

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
M	D05		I
M	B02		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

The Natural Resources Wales weblink below provides access to information on its designated sites. Detailed information about this Natura 2000 site can be accessed via the Management Plan link provided in Section 6.2. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-lan

http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

Back to top

5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0	UK01	39.3		

6. SITE MANAGEMENT

Back to top

6.1 Body(ies) responsible for the site management:

Organisation:	Natural Resources Wales
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

X	Yes	Name: MORFA HARLECH A MORFA DYFFRYN Link: https://www.naturalresources.wales/media/672822/Morfa%20Harlech%20a%20Morfa%20Dyffryn%20SAC%20Manage
	No, but in preparation	
	No	

EXPLANATION OF CODES USED IN THE SPECIAL AREA OF CONSERVATION (SAC) AND SPECIAL PROTECTION AREA (SPA) STANDARD DATA FORMS

The codes in the table below generally follow those explained in the official European Union guidelines for the Standard Data Form (also referencing the relevant page number).

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	SPA (classified Special Protection Area)	53
B	cSAC, SCI or SAC (candidate Special Area of Conservation, Site of Community Importance, designated Special Area of Conservation)	53
C	SPA area/boundary is the same as the cSAC/SCI/SAC i.e. a co-classified/designated site (Note: this situation only occurs in Gibraltar)	53

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha• rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Habitat representativity (abbreviated to 'Representativity' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent representatively	57
B	Good representatively	57
C	Significant representatively	57
D	Non-significant presence representatively	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	58
B	> 2%-15%	58
C	≤ 2%	58

3.1 Degree of conservation (abbreviated to 'Conservation' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global assessment (abbreviated to 'Global' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	62
B	> 2%-15%	62
C	≤ 2%	62
D	Non-significant population	62

3.2 Degree of conservation (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Other species – essentially covers bird assemblage types

CODE	DESCRIPTION	PAGE NO
WATR	Non-breeding waterbird assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code

BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK04	Site of Special Scientific Interest (GB)	67
UK05	Marine Conservation Zone	67
UK06	Nature Conservation Marine Protected Area	67
UK86	Special Area (Channel Islands)	67
UK98	Area of Special Scientific Interest (NI)	67
IN00	Ramsar Convention site	67
IN08	Special Protection Area	67
IN09	Special Area of Conservation	67

Conservation (Natural Habitats, &c.) Regulations 2010 (SI 2010 No. 490)

COFNOD YN Y GOFRESTR O SAFLEOEDD EWROPEAIDD I GYMRU

ENTRY IN THE REGISTER OF EUROPEAN SITES FOR WALES

(Rheoliad / Regulation 13)

***ENW'R SAFLE*:**
SITE NAME: Northern Cardigan Bay / Gogledd Bae Ceredigion

***MATH O SAFLE*:** Ardal Gwarchodaeth Arbennig (AGA)
***SITE TYPE*:** Special Protection Area (SPA)

CÔD Y SAFLE:
SITE CODE: UK9020327

Dosbarthwyd yn Ardal Gwarchodaeth Arbennig gan:

Ysgrifennydd y Cabinet dros yr Amgylchedd a Materion Gwledig, un o Weinidogion Cymru.

Dyddiad:

30 Ionawr 2017

O dan adran 2 o Ddeddf y Cymunedau Ewropeaidd 1972

***LLEOLIAD*:**

Awdurdod unedol:
Ceredigion
Gwynedd

Gweler hefyd y map(iau) amgaeëdig, nad ydynt yn ffurfio rhan o'r cofnod hwn.

***Cyfesurynnau*:**
Hydred -4.2481, Lledred 52.6521,
Cyfeirnod Grid Cenedlaethol Arolwg Ordnans: SH4942708897

Classified as a Special Protection Area by:

Cabinet Secretary for Environment and Rural Affairs, one of the Welsh Ministers.

Date:

30 January 2017

Under section 2 of the European Communities Act 1972

***LOCATION*:**

Unitary authority:
Ceredigion
Gwynedd

See also the accompanying map(s), which do not form part of this entry.

***Coordinates*:**
Longitude -4.2481, Latitude 52.6521,
Ordnance Survey National Grid Reference: SH4942708897

MAE'R SAFLE YN GYMWYS O DAN ERTHYGL 4 O GYFARWYDDEB CYNGOR 79/409/EEC (Y GYFARWYDDEB ADAR) TRWY GEFNOGI'N RHEOLAIDD Y POBLOGAETHAU ADAR CANLYNOL

THE SITE QUALIFIES UNDER ARTICLE 4 OF COUNCIL DIRECTIVE 2009/147/EC (THE BIRDS DIRECTIVE) BY REGULARLY SUPPORTING THE FOLLOWING BIRD POPULATIONS

RHYWOGAETHAU A RESTRIR YN ATODIAD 1 Y GYFARWYDDEB (ERTHYGL 4.1)	***SPECIES LISTED IN ANNEX I OF THE DIRECTIVE (ARTICLE 4.1)***
Yn ystod y tymor magu	***During the breeding season***
Dim yn berthnasol	Not applicable
Yn ymweld wrth fynd heibio	***On passage***
Dim yn berthnasol	Not applicable
Gaeafu	***Over winter***
Trochydd gyddfgoch, *Gavia stellata,* 1,186 unigolyn yn cynrychioli 7% o boblogaeth gaeafu Prydain Fawr (2001/02 – 2003/04)	Red-throated diver *Gavia stellata*, 1,186 individuals representing 7% of the wintering population in Great Britain (2001/02 – 2003/04)
RHYWOGAETHAU SYMUDOL A WELIR YN AML (ERTHYGL 4.2)	***REGULARLY OCCURRING MIGRATORY SPECIES (ARTICLE 4.2)***
Yn ystod y tymor magu	***During the breeding season***
Dim yn berthnasol	Not applicable
Yn pasio heibio	***On passage***
Dim yn berthnasol	Not applicable
Gaeafu	***Over winter***
Dim yn berthnasol	Not applicable
YMGYNNULL O LEIAF 20,000 O ADAR Y MOR MEWN UNRHYW DYMOR(ERTHYGL 4.2)	***ASSEMBLAGE OF AT LEAST 20,000 WATERFOWL OR SEABIRDS IN ANY SEASON (ARTICLE 4.2)***
Dim yn berthnasol	Not applicable

***GWNAED Y COFNOD HWN*:**

30 Ionawr 2017

***GAN*:**

Louise George, Pennaeth y Gangen Cadwraeth Morol, dan awdurdod Ysgrifennydd y Cabinet dros yr Amgylchedd a Materion Gwledig, un o Weinidogion Cymru.

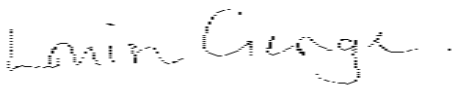
THIS ENTRY MADE ON:

30 January 2017

BY:

Louise George, Head of Marine Conservation Branch, under authority of the Cabinet Secretary for Environment and Rural Affairs, one of the Welsh Ministers.

***LLOFNOD*:**



***SIGNATURE*:**

DYDDIAD(AU) COFNODION BLAENOROL AR GYFER Y SAFLE HWN:

-

DATE(S) OF PREVIOUS ENTRIES FOR THIS SITE:

-

Appendix F

Statement to Inform an Appropriate Assessment (SIAA)

Barmouth Viaduct Gardens – Coastal Scheme

Habitats Regulations Assessment (HRA)

June 2023

CPF8169



Document Control Sheet

Document Title:	Habitats Regulations Assessment
Document Author(s):	Rhys Thomas
Project Ref / Title:	CPF 8169 - Barmouth Viaduct Gardens Coastal Scheme
Project Manager:	Owain Ellis Griffith

Revision History

Date	Version No.	Summary of Changes
7/10/2022	0.01	Initial Draft
07/06/2023	0.02	2nd draft following updated scheme design

Reviews

Name	Title	Date	Version
David Harries	Principal Ecologist	14/06/2023	0.02

Approvals

Name	Title	Date	Version
Owain Ellis Griffith	Principal Environment Officer	15/06/2023	0.02

Distribution

Name	Title	Date	Version

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ISO14001:2015
EMS 526388

ISO45001
OHS 526389

Contents

1.0 INTRODUCTION 5
1.3 European Sites and Ramsars 9
2.0 THE NEED FOR ASSESSMENT AND IDENTIFYING EUROPEAN SITES AT RISK 14
3.0 SCREENING 23
4.0 FORMAL SCREENING OPINION 32
5.0 APPROPRIATE ASSESSMENT 33
6.0 IN-COMBINATION ASSESSMENT 47
7.0 FORMAL INTEGRITY TEST / CONCLUSION 51
8.0 REFERENCES 52

Appendices

A. European Sites Potentially at Risk
B. Site Plans
C. Phase 1 habitat plans
D. Aerial Plan
E. Site Photographs
F. Construction Methodology

List of Abbreviations

AA	Appropriate Assessment
AIES	Assessment of Implications on European Sites
cSAC	Candidate Special Area of Conservation
EMS	European Marine Site
ES	Environmental Statement
FCS	Favourable conservation status
HRA	Habitats Regulations Assessment
IEEM	Institute of Ecology and Environmental Management
IROPI	Imperative Reasons of Over-riding Public Interest
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effect
OMS	Offshore Marine Site
PEU	Plainly Established and Uncontroversial
PPG	Pollution Prevention Guideline
pRamsar	Possible Ramsar Site
pSAC	Possible Special Area of Conservation
pSPA	Potential Special Protection Area
SAC	Special Area of Conservation
SPA	Special Protection Area

Executive Summary

This report comprises a Habitats Regulations Assessment (HRA) for coastal defence improvement works to the Viaduct Gardens frontage wall at Barmouth, Gwynedd. An HRA is an assessment of impacts on European protected sites of importance for nature conservation.

The proposed works consists of improvements to the Viaduct Gardens sea wall. The height of the existing wall will be increased with the installation of a reinforced concrete parapet. The wall will also be strengthened with the installation of sheet piling and reinforced concrete. The proposals also include the placement of rock armour in front of the wall to dissipate wave energy. The length of the frontage wall to be repaired and improved is approximately 60m. A new surface water outfall is being incorporated in to the works, which will extend out from the wall onto the beach for a distance of approx. 22m.

Works will take place partly within and adjacent to a European protected site, and within close proximity to other sites which have mobile species as qualifying features.

Following a Screening Assessment, the first stage of the HRA identified that there would be 'Likely Significant Effects' for Pen Llyn a'r Sarnau SAC and Afon Eden – Cors Goch Trawsfynydd SAC. Therefore, the assessment progressed to Stage 2 'Appropriate Assessment' stage, which considered the potential for the works to have an adverse effect on the integrity of the sites, taking proposed mitigation measures into account. It should be noted that the information included in this report

relating to Stage 2 forms a Statement to inform an Appropriate Assessment (SIAA), as the Appropriate Assessment itself will be made by the Competent Authority.

The assessment concluded that without mitigation the two SAC's could be affected, by pollution, habitat degradation, and disturbance of mobile species, but mitigation measures could be implemented that would eliminate the chance of any residual effects on the integrity of the sites.

1.0 INTRODUCTION

YGC have been commissioned to undertake a Habitats Regulations Assessment (HRA) for proposed works to reduce coastal flood risk to the community of Barmouth, Gwynedd. The proposed works are located at the mouth of the Afon Mawddach, at the southern end of Barmouth (NGR: SH 61549 15531). The purpose of this HRA is to assess the impact of the proposals on sites of international importance for biodiversity.

Barmouth (Abermaw), Gwynedd, is located on the northern shore on the mouth of the Mawddach Estuary. The sea front at Barmouth suffers from flooding due to both overtopping of the sea wall and surface run-off from the bluff behind the town (Dinas Oleu). A Project Appraisal Report (PAR) was originally undertaken in 2004. This was updated in 2018 and formed the basis of an Outline Business Case (OBC) approved June 2021. The OBC presented nine options for coastal flood risk management along the sea front. A preferred option of repairing and improving the frontage wall at Viaduct Gardens is now being progressed through Full Business Case (FBC).

The preferred option presented consists of improvements to the Viaduct Gardens sea wall. The height of the existing wall will be increased in this area. The works can be summarised into the following elements:

- The existing filled garden area behind the existing sea wall will be stabilised through the use of sheet piling and/or king post walls. The installation of these will be mainly from the Viaduct Garden side of the wall.
- Existing wall will be demolished in sections, with the existing rock armour at toe of wall moved back from the wall to expose the face (rock armour material to be re-used upon completion of new wall).
- Construction of new wall consist of lower and middle section, with a reinforced concrete parapet on top. A concrete foundation slab is to be cast in situ, with precast L shaped units laid on the foundation base. The lower section will be backfilled with mass concrete. The parapet wall will be installed as an in-situ wall once the lower and mid sections are complete.
- Rock armour is to be installed along the base of the new wall. Previously removed armour will be used, along with some additional armour.
- A new surface water pipe outfall is to be constructed which involves the installation of a 750mm diameter pipe, which will protrude approx. 22m from the new wall face. Beach material will need to be excavated to accommodate the pipe, which will sit on a concrete mattress (2.4m wide) and be encased in 250mm thick concrete. Rock armour will be placed each side of the pipe at the lower 12m section, and nn anti-scour basin will be constructed at the outfall, consisting of rock armour. (Scheme drawings are presented in Appendix B)

The length of the frontage wall to be improved as part of the scheme is approximately 60m.

The construction works associated with this project are limited to the viaduct gardens sea wall and the foreshore area where the new pipe outfall is to be constructed. Machinery access to the intertidal area will be required via the main harbour slipway.

The proposed works are located adjacent to and within the Pen Llyn a'r Sarnau SAC, and in close proximity to other European protected sites, as detailed further in this report.

1.2 Authors

This HRA has been prepared by:

- Rhys Meilyr Thomas, PGDip, with 4 years of ecological consultancy experience, including HRA and Environmental Impact Assessment (EIA) of large projects;

- David Harries MSc CIEEM CEnv with over 15 years of ecological consultancy experience, including HRA and Ecological Impact Assessment (EcIA) of large projects.

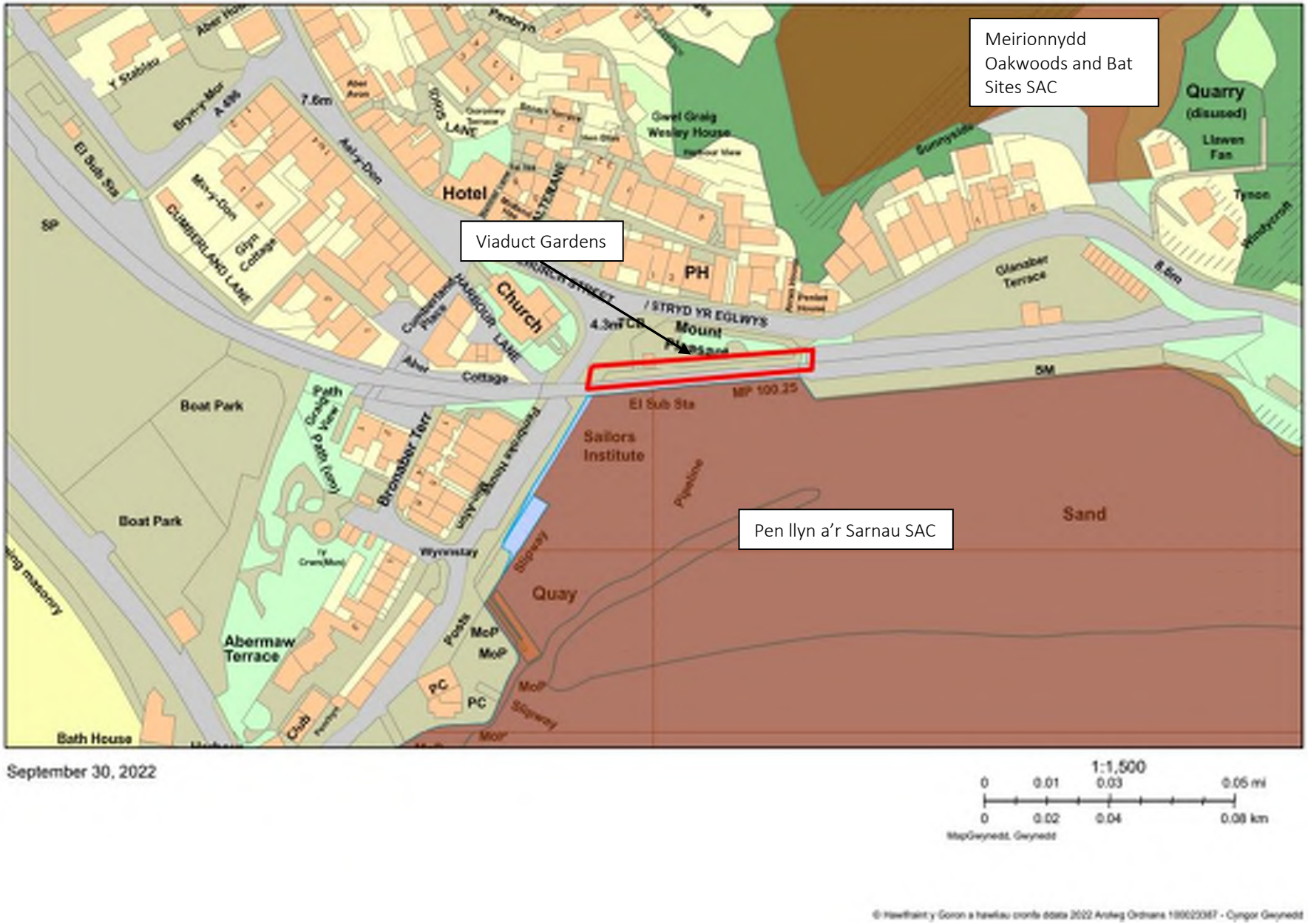


Figure 1: Location of proposed works (outlined red) in relation to internationally protected sites (SAC - brown shading)

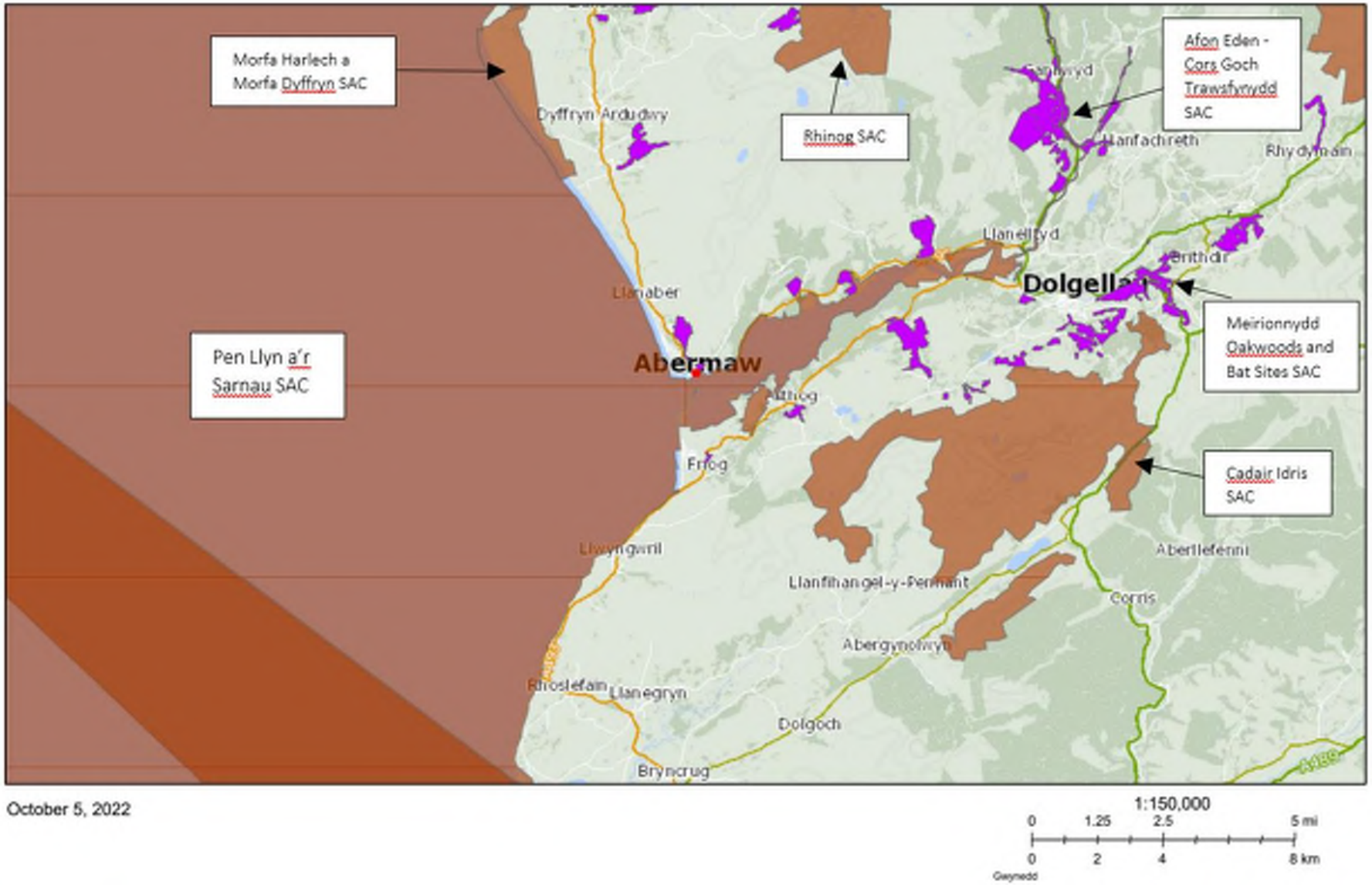


Figure 2: Location of proposed works (red dot) in relation to internationally protected sites (SAC - brown shading. Purple shading denotes Meirionnydd Oakwood and Bat sites SAC locations.)

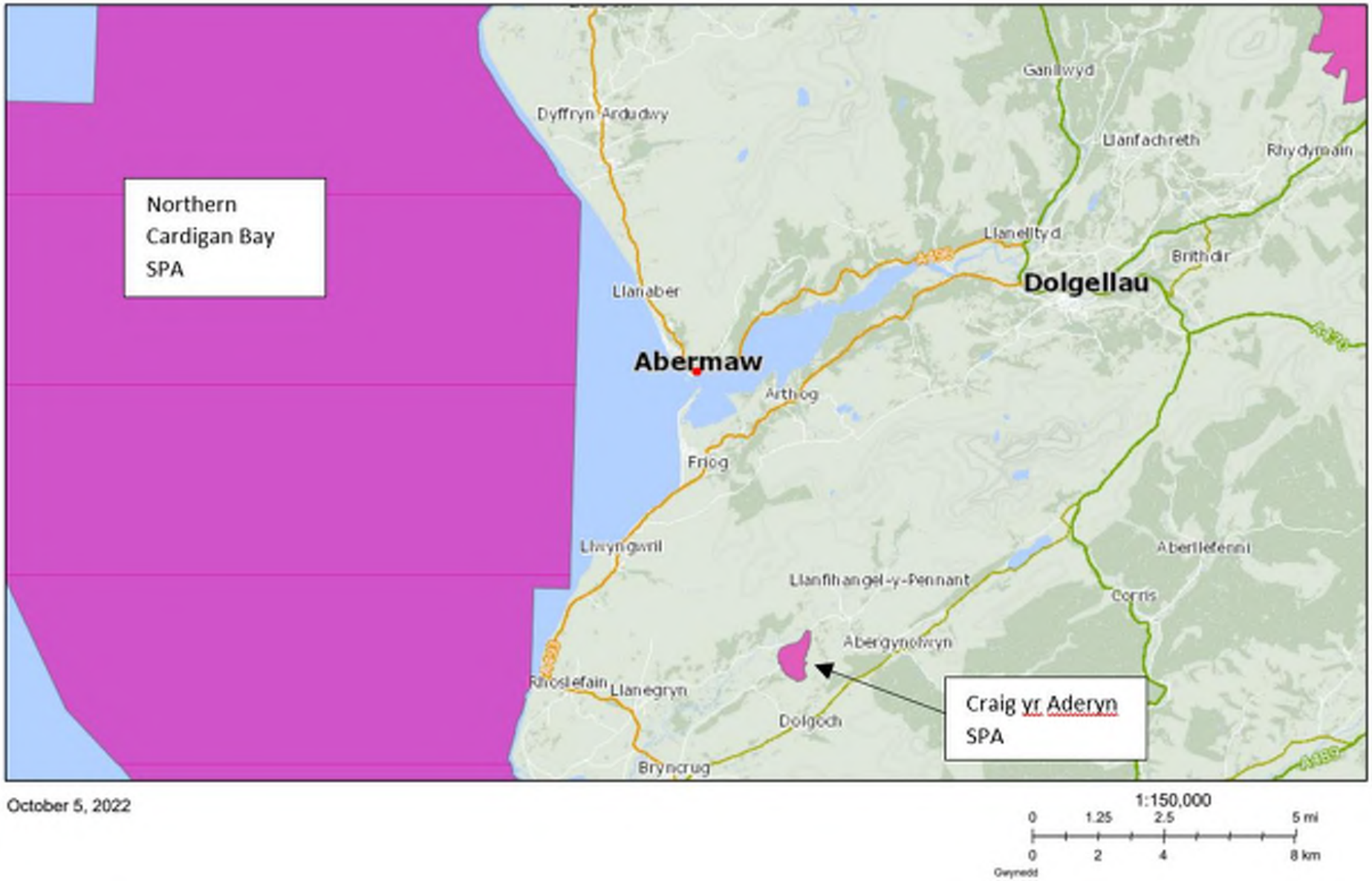


Figure 3: Location of proposed works (red dot) in relation to internationally protected sites (SPA - pink shading)

1.3 European Sites and Ramsars

The EU Habitats Directive requires competent authorities to assess the impacts of plans and projects on the Natura 2000 network of protected sites, including Special Protection Areas (SPAs) and Special Areas of Conservation (SACs). In England and Wales, the Directive is implemented by the Conservation of Habitats and Species and Planning (Various Amendments) (England and Wales) Regulations 2017 (the 'Habitats Regulations'). These set out the requirement for a Habitats Regulations Assessment (HRA) where necessary, comprising a series of mandatory tests.

According to Government policy and advice, 'Wetlands of International Importance' or Ramsar sites, although not subject to the Habitats Regulations, should be treated within the planning system in the same way as SACs and SPAs (or 'European sites'). The same level of protection is also given to potential or proposed sites (i.e. pSPA, pSAC and pRamsar), which have not yet been formally designated.

1.4 The HRA of Projects

HRA asks specific, mandatory questions of development projects. Firstly, a pre-screening process establishes whether a project can be exempted, excluded or eliminated, either because it is directly connected with the conservation management of the protected site, or it doesn't qualify as a 'project' (within the meaning and scope of the Habitats Directive), or because it couldn't conceivably affect any protected sites. If it cannot be discounted for these reasons, it has to undergo a process involving the four stages outlined in Table 1 and Figure 2 below.

The first stage is to screen the project to identify if it may result in a likely significant effect, whether alone or in-combination with other plans or projects. Provided that these significant effects can be ruled out, then no further assessment is needed. Following recent case law (People over Wind, 2017), mitigation cannot be taken into consideration at this stage.

If likely significant effects cannot be ruled out, then the project will proceed to the 'Appropriate Assessment' stage which explores the impacts in terms of the site's conservation objectives. This is to identify whether it can be ascertained that *it will not adversely affect the integrity of the European site*. It is only at this stage that mitigation measures can be considered or imposed (such as changes to design or timing of works). If the Appropriate Assessment can rule out any adverse effects on the integrity of the European site (with or without mitigation), the project may then be consented.

If adverse effects cannot be ruled out, then the assessment progresses to stages three and four and specific derogations may be sought. These determine whether alternative solutions exist and if not, whether imperative reasons of overriding public interest apply and if so, whether compensation is feasible. It should be noted that use of the derogations is regarded as a last resort and should be considered only in exceptional circumstances. The majority of projects are resolved during stages 1 and 2 of the HRA process, as few would manage to pass the strict tests of stages 3 and 4.

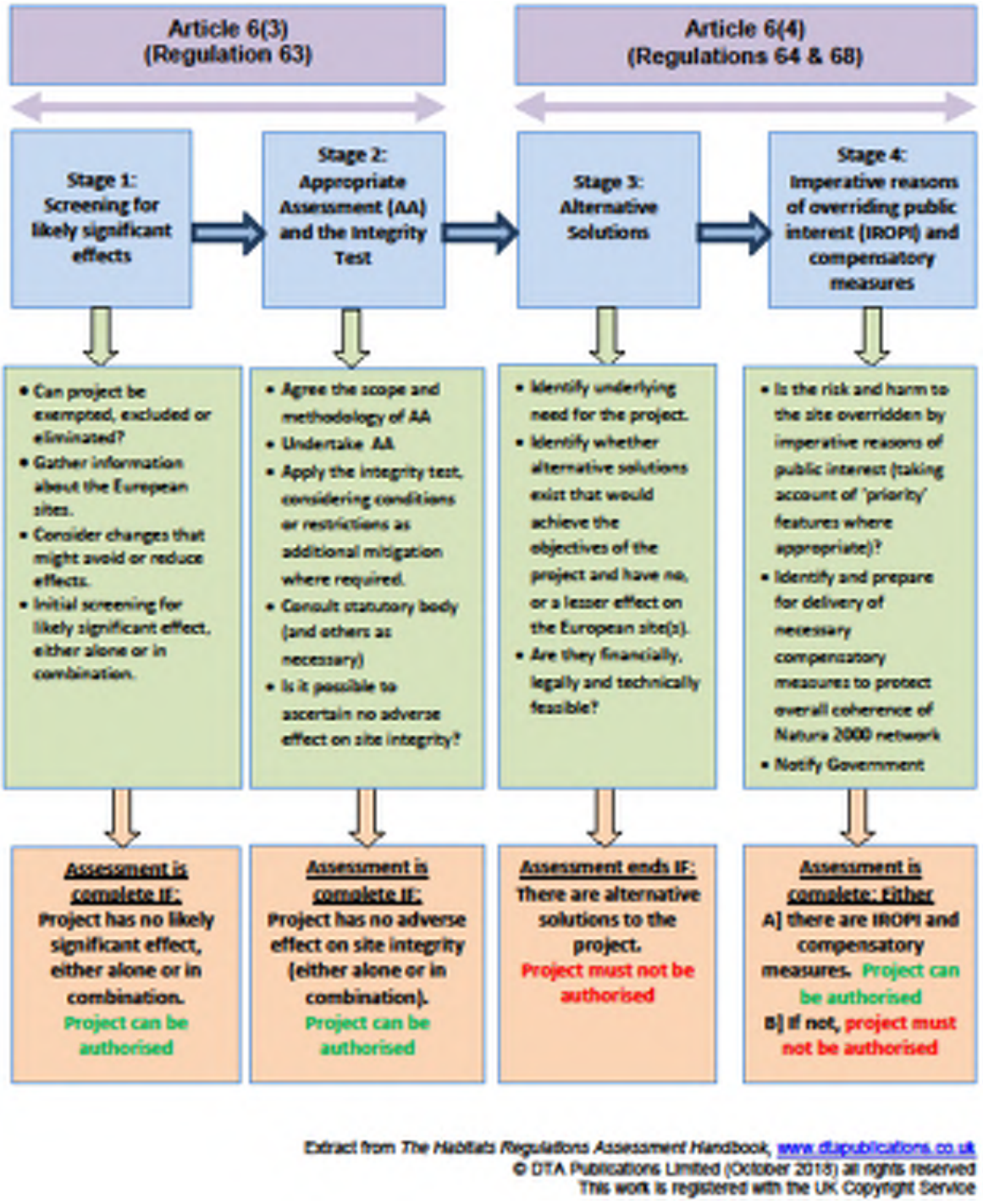
Table 1: Summary of the four-stage HRA process

Stage	Test	Task
1	Screening	If the project cannot be excluded from the process (pre-screening), this stage determines if the project will lead to a 'likely significant effect' on a European site alone or in-combination with other plans or projects. This stage uses a very precautionary approach, without consideration of mitigation measures. This stage involves gathering information about the protected sites but is not a detailed analysis of the impacts
2	Appropriate Assessment and Integrity Test	If 'likely significant effects' cannot be ruled out, a more thorough 'appropriate assessment' must be carried out to assess whether it is possible to ascertain whether the project will have an 'adverse effect on the integrity of the site' (AEOI) or not. Mitigation can be considered at this stage but not before
3	Alternative Solutions	If 'AEOI' cannot be ruled out, the HRA must explore whether less damaging 'alternative solutions' could deliver the overall objective of the project
4	Imperative Reasons of Over-riding Public Interest (IROPI) and Compensation	If no alternative solutions exist, the project can only proceed if 'IROPI' apply and 'compensatory measures' must be delivered before consent can be granted

This HRA uses guidance provided by the Habitats Regulations Assessment Handbook (DTA, 2013, February 2019 edition), which draws on best practice and case law from the UK and across the EU to inform best practice. The definitions of HRA terminology used in the assessment can be found in the HRA Handbook.

This document contains information for Stage 1 (Screening) - Test of Likely Significant Effects and information to inform Stage 2: Appropriate Assessment – the consideration of the impact of the project on the integrity of the internationally protected sites, either alone or in combination with other projects or plans.

Extent of knowledge, use of professional judgement and the precautionary principal of professional judgment have been used in the gathering of data and in the interpretation of results gained in relation to the potential impacts, mitigation and significance of any residual impacts, and consideration against conservation objectives. If information is unknown about a potential impact on a species, then the precautionary principal has been used.



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Figure 4: Outline of the four-stage approach to the Habitats Regulations Assessment of projects

1.5 Definitions, Evidence and Case Law

Stage One – Screening

In the context of a likely significant effect, 'likely' means a possible (or the risk of a) significant effect whose occurrence cannot be excluded on the basis of objective information. 'Significant' means if it is likely to undermine the conservation objectives of a European / internationally important site. 'Objective information' can be defined as a clear verifiable fact rather than a subjective opinion and when carrying out a screening assessment, it is not that significant effects are probable, it is that a risk is 'sufficient'. However, there must be credible evidence that there is a 'real', rather than a 'hypothetical' risk.

An 'in-combination' assessment is only required when an impact is identified as having an insignificant effect on its own (but residual effects remain) that may become significant when taken into consideration with other plans or projects. This type of assessment is only required during the screening stage, although it can be difficult to distinguish between likely significant effects when considered alone or in-combination. Additionally, the rather coarse nature of the screening stage can sometimes preclude or compromise the necessary analysis and an incorrect choice can sometimes prompt extensive and unnecessary work, which is a limitation of this process. Therefore, unless the issues at the screening stage are clear, this HRA assumes that all likely significant effects apply alone with no residual effects. This will ensure all possible effects are considered and assessed for more thorough analysis in the appropriate assessment if required.

Stage Two – Appropriate Assessment and the Integrity Test

Regulation 63 states that where a plan is 'likely to have a significant effect', it can only be consented if the competent authority can ascertain that it 'will not adversely affect the integrity of the European site.' An Appropriate Assessment is defined as "the consideration of the impact on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts".

The 'integrity' of a European site is defined as:
'*the coherence of its ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified or listed.'*

The European Commission defined it more recently as follows:
'The integrity of the site involves its constitutive characteristics and ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the habitats and species for which the site has been designated and the site's conservation objectives.'

As the HRA process is an iterative process, further scrutiny during the Appropriate Assessment will inevitably confirm or challenge the outcomes of the screening exercise. As a result, this may result in changes such as the identification of new or removal of existing effects, or the need for an in-combination screening assessment.

In accordance with the principles of the mitigation hierarchy, if mitigation measures are able to remove an adverse effect, the measure should be adopted regardless of the cost or difficulty.

Favourable Conservation Status

The aim of the Habitats Directive is to maintain or restore the habitats and species (or qualifying features) listed in Annex I and Annex II respectively, to favourable conservation status (FCS) to ensure their long-term survival is secured across their natural range within the EU. This is described in Articles 1(e) and 1 (i) of the Directive as follows:

The conservation status of a natural habitat will be taken as favourable when:

- *Its natural range and areas it covers within that range are stable or increasing;*
- *The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and*
- *The conservation status of its typical species is favourable as defined in (i)*;

[and]
The conservation status of a species will be taken as favourable when:

- *Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;*
- *The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and*
- *There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.*

These targets may apply across several member states but are delivered by site-based conservation objectives. Site-based conservation objectives can be defined as *'a set of specified objectives to be met in a site in order to make sure that the site contributes in the best possible way to achieving FCS at the appropriate level (taking into account the natural range of the respective species or habitat types)'.*

Priority features

Some of the qualifying features of the Natura 2000 European sites are listed as 'Priority features'. These are treated in the same way as the other features during Stages 1 and 2 of an HRA, but at Stage 4, Imperative reasons for overriding public interest (IROPI) are restricted to those relating to human health, public safety or beneficial effects on the environment if priority features would or could be adversely affected by a plan or project. In other words, IROPI of a social or economic nature alone cannot be considered sufficient reasons for impacts on 'priority features' when assessing the derogations (Stages 3 and 4 of HRA).

Mitigation and case law

The People Over Wind case provided a new interpretation of when and how mitigation measures should be considered in an HRA. In 2017, the European Court of Justice departed from previous decisions, clearly identifying that measures specifically designed to avoid or reduce likely significant effects should not be evaluated at the screening stage, and should be reserved for the Appropriate Assessment stage.

Role of the competent authority

It is the competent authority's responsibility to decide whether or not to adopt this assessment as part of their duty under the Habitats Regulations.

2.0 THE NEED FOR ASSESSMENT AND IDENTIFYING EUROPEAN SITES AT RISK

2.1 Exclusion, Elimination and Exemption from the Need for Assessment

Prior to the identification of vulnerable European sites, Stage 1 of the HRA process encourages a brief 'pre-screening' exercise to determine whether there is actually a need for an HRA. It decides whether a proposed development can be:

- Exempted from the HRA because it is '… directly connected with or necessary for the management of the … European site';
- Excluded from the HRA because 'it is not a project within the meaning and scope of the Habitats Directive'; or
- Eliminated from the HRA because it can easily be shown that although 'it is a project … it could not have any conceivable effect on any European site'.

Following this pre-screening exercise, it is evident that the proposed development does in fact represent a project within the meaning and scope of the Habitats Directive with the potential to cause harm to European sites. As a result, it can neither be excluded nor eliminated from the HRA. Additionally the purpose of the project is not directly connected with or necessary to the management of European sites, and so it cannot be made exempt from the HRA process. Therefore, the first steps of the Stage 1 assessment will need to commence by identifying which European sites (and associated features) may be at risk. The identification of these sites is outlined in the section below.

2.2 Identification of European sites at risk

This HRA has adopted a precautionary 10km radius from the proposed works to search for European protected sites at risk. This distance is considered to be the maximum extent that a project of this nature and scale could reasonably be expected to generate measurable effects. Using the data from 'Map Gwynedd' (the Gwynedd Council GIS database), the sites within this area are listed in Table 2 below and shown in Figure 1 above.

Table 2. European sites within 10km of the proposed works (or further if mobile species features could be affected)

European site	Distance
Pen Llyn a'r Sarnau SAC	Within the footprint of the proposed works.
Meirionnydd Oakwoods and Bat Sites SAC	50m north of the proposed works at its nearest point.
Northern Cardigan Bay SPA	3.5km west of proposed works.
Cadair Idris SAC	4.3km south east of proposed works.
Morfa Harlech a Morfa Dyffryn SAC	7.1km north west of proposed works.
Craig yr Aderyn SPA	8.7km south of proposed works.
Rhinog SAC	9.7km north east of proposed works.
Afon Eden - Cors Goch Trawsfynydd SAC	11km east of proposed works.

In some instances, sites require a larger search radius of up to 30km if they support highly mobile qualifying species such as lesser horseshoe bats or otters that could be affected by the proposed

works. In this instance there are no other sites with lesser horseshoe bats as a qualifying species feature within 30km of the proposals, other than Meirionnydd Oakwoods and Bat Sites SAC.
Otters are likely to use the estuary habitat adjacent to the proposals. A buffer zone of 25km is typically applied for assessing impacts on sites with otter as a qualifying mobile species. Other than Pen Llyn a'r Sarnau SAC which is within the footprint of the works, the only other site within 25km which includes otter as a qualifying species is Afon Eden - Cors Goch Trawsfynydd SAC. This site is therefore included in this assessment.

Pen Llyn a'r Sarnau SAC is classified as a 'European Marine Site' (EMS). All EMSs are accompanied by bespoke conservation objectives and supplementary advice. The HRA will initially focus solely on the high-level objectives and then, if necessary, further scrutiny of other objectives will be reserved for the appropriate assessment.

The presence of a site on the list in Table 2 doesn't in itself justify its inclusion in subsequent stages of the HRA process, as this depends on the characteristics of the site and the possible impact pathways between the two. Therefore, to encourage a consistent, reliable and repeatable process, the HRA Handbook identifies 22 generic criteria (including sub-criteria) to focus the assessment on relevant sites only, as shown in full in Appendix A. If no European sites are identified in the final column of this table then none will be considered to be at risk and no further scrutiny is needed. In practice, this process can alter the area of search by expanding it (for instance in the case of riverine sites) or shrinking it where the evidence demands that harmful effects are unlikely.

Importantly, although the outcomes of the site identification task will reflect the type and location of the proposed development, and/or the ecological characteristics of the European sites, it does not represent the test for likely significant effect (which follows later).

Of the 22 criteria listed, five were considered to be a credible threat to European sites in the area and are presented in Table 3 below, with Columns 2 and 3 in Appendix A omitted. The remaining criteria have been removed from any further consideration in this HRA as they are not relevant to the proposed works.

Table 3. Scanning and site selection list for European sites that could potentially be at risk from the proposed works

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
(1) All projects (terrestrial, coastal and marine)	**Sites within which the project is wholly or partly located.** The proposed works will take place partly within the Pen Llyn a'r Sarnau SAC. The frontage wall is located immediately outside the SAC boundary. The installation of sheet piling and associated works to the wall will be taking place outside the SAC. The placement of rock armour in front of the frontage wall will extent out onto the foreshore, however this will not extend out as far as the SAC boundary, therefore there would be no direct loss of SAC habitat as a result of this activity. The installation of a new surface water outfall pipe will extend out from the sea wall, and into the SAC resulting in construction work within the SAC itself, and minor land take of SAC habitat. The proposed works will be taking place within and adjacent to a mosaic of intertidal habitats, and machinery and equipment access to the frontage will be required along the foreshore (through the SAC), therefore the risk of habitat loss or degradation as a result of construction activity cannot be ruled out. Works will be taking place within the intertidal SAC habitat, and on land directly adjacent to the SAC, therefore there is a risk of contamination of SAC habitats should there be an unmitigated pollution event during the construction period. There is also a risk of habitat loss due to land required to accommodate the new surface water outfall within the SAC. **Therefore, at this stage the potential for harmful effects on the Pen Llyn a'r Sarnau SAC and its features cannot be ruled out and further consideration is required.**	Pen Llyn a'r Sarnau SAC
(2) Projects that could affect wetland features	**Effects considered are those associated with the physical presence of built development and the localised effects on surface/groundwater resources and quality, resulting from changes in run-off, sedimentation, erosion, etc.** The proposed works are partly located within Pen Llyn a'r Sarnau SAC, a marine site (see Criterion (3) below). Morfa Harlech a Morfa Dyffryn SAC and Northern Cardigan Bay SPA are hydrologically connected.	see Criterion (3) below

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
	(see Criterion (3) below) The Meirionnydd Oakwoods and Bat Sites is located 50m north of the site at it's nearest point and could be susceptible to settlement of suspended dust particles during construction, however it is considered highly unlikely that this will impact upon the site's wetland features. There are no direct hydrological connections between the proposed works and the SAC. Effects on the wetland features of this site have been scoped out. Effects Can be ruled out for Cadair Idris SAC, Craig yr Aderyn SPA and Rhinog SAC given the distance of these sites from the scheme, the size and nature of the proposed works, and the lack of hydrological connectivity. Afon Eden-Cors Goch Trawsfynydd is connected by the Mawddach Estuary, located where the Afon Mawddach enters the estuary, c.11km upstream at its closest point. However, due to the distance of this site and its location upstream of the proposed works, effects on the wetland features of this site have been scoped out.	
(3) Projects that could affect the marine environment (Criterion (2): 'Projects that could affect wetland features' is also covered here as the wetland features in this case are all marine)	**Effects considered are those associated with the physical presence of built development and the localised effects on surface/groundwater resources and quality, resulting from changes in run-off, sedimentation, erosion, etc.** The proposed works will be taking place within and directly adjacent to the Mawddach Estuary, which forms part of the Pen Llyn a'r Sarnau SAC. There is some potential for the proposed works to cause adverse pollution impacts on the immediate and surrounding Pen Llyn a'r Sarnau SAC habitats during construction. Coastal defence developments have the potential to affect the hydraulic conditions of the surrounding coastal environment, which could lead to long term impacts upon nearby habitats. In this case, there is no change in the footprint of the wall itself, and the placement of rock armour in front of the wall is replicating the current conditions (apart from a small section on the eastern section where there is currently no rock armour present). Therefore, it is not likely that there will be any significant change in the hydraulic conditions as a result of the works, therefore this impact is scoped out.	Pen Llyn a'r Sarnau SAC

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
	The proposals include the installation of a new surface water outfall pipe, which will extend out from the sea wall into the intertidal area of the SAC. This has the potential to result in loss of overall area of SAC habitat due to the land required to accommodate the surface water pipe, however this is expected to be very minor given the footprint of the new pipe. The new outfall will discharge surface water, as is currently the case with the outfall that is being replaced. Northern Cardigan Bay SPA is hydrologically connected to the proposed works (3.5km west) and could potentially be affected by adverse pollution impacts during construction. Given the nature and scale of the works proposed, the distance of the works from the SAC, and the high dilution factor associated with the marine environment, it is not likely that this site would suffer significant effects from pollution during construction. However, there is potential for effects on the habitats of the red-throated diver outside of the SAC, which is considered under criteria 5 below. Morfa Harlech a Morfa Dyffryn SAC is hydrologically connected to the proposed works via the coast (7.1km north). However, given the nature and scale of the works proposed, the distance of the works from the SAC, and the high dilution factor associated with the marine environment, it is not likely that this site would suffer significant effects from pollution during construction. Potential effects on the features of this site have therefore been scoped out. **Therefore, at this stage the potential for harmful effects on the Pen Llyn a'r Sarnau SAC and its features cannot be ruled out and further consideration is required.**	
(5) Projects that could affect mobile species	**Criterion 5 includes sites whose qualifying features include mobile species which may be affected by the project irrespective of the location of the project or whether the species would be in or out of the site when they might be affected.** Mobile species are those considered to spend part of their life-cycle on land, in water or air beyond the designated site boundary. Typically, it focuses on potential impacts on functionally-linked land	Pen Llyn a'r Sarnau SAC Afon Eden – Cors Goch Trawsfynydd SAC.

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
	and water utilised by the birds, mammals and migratory fish associated with the European sites listed. Pen Llyn a'r Sarnau SAC has mobile species features that include otter, grey seal and bottlenose dolphin. The proposed works has the potential to effect the mobile species features of the site through disturbance or through water pollution and habitat degradation during construction. Otter and Atlantic Salmon are mobile species features of the Afon Eden – Cors Goch Trawsfynydd SAC, and the populations could utilise land/waters in the Mawddach Estuary, adjacent to the proposed works. Lesser horseshoe bat is a mobile species feature of the Meirionnydd Oakwoods and Bat Sites SAC. This species could utilise land within or adjacent to the area of proposed works for foraging. There is also potential for effect on the habitats of the red-throated diver feature of the Northern Cardigan Bay SPA. While the Craig yr Aderyn SPA has mobile species features, given the distance of this site from the works and lack of hydrological connectivity, the likelihood of significant harmful effects can be ruled out. Note that 'indirect' effects on mobile species on functionally – linked land or water beyond the development site, are considered under other criteria 14 and 15 below. **Therefore, at this stage the potential for harmful effects on Pen Llyn a'r Sarnau SAC, Afon Eden – Cors Goch Trawsfynydd SAC, the Meirionnydd Oakwoods and Bat Sites SAC, and the Northern Cardigan Bay SPA and their features cannot be ruled out and further consideration is required.** *Note: There is a close link between criterion 5 and criteria 14 and 15 below.*	Meirionnydd Oakwoods and Bats Sites SAC Northern Cardigan Bay SPA

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
(14) Projects which could introduce or increase, or alter the timing, nature or location of disturbance to species	**Criterion 14 refers to sites whose qualifying features are considered to be potentially sensitive to disturbance, for example as a result of noise, activity or movement or the presence of disturbing features that could be brought about by the project.** There is a risk of disturbance to otters, a qualifying feature of the Pen Llyn a'r Sarnau SAC and Afon Eden – Cors Goch Trawsfynydd SAC, during construction. However, this would be minimal as the location is already subject to high levels of disturbance, and for this reason is considered unlikely to support otter resting sites. Furthermore, the works would be undertaken during daylight hours when otter activity is minimal. Lesser Horseshoe Bats is a mobile species feature of Meirionnydd Oakwoods and Bat sites SAC. There may be a small risk of temporary disturbance during construction phase. There are no cofnod records of Lesser Horseshoe Bat roosts within 1km of the proposed works. **Therefore, effects that include potential disturbance of otters cannot be ruled out for the Pen Llyn a'r sarnau SAC and Afon Eden – Cors Goch Trawsfynydd, along with effects that include potential disturbance of lesser horseshoe bats for the Meirionnydd Oakwoods and Bat Sites SAC, and further consideration is required.** *Note: There is a close link between criterion 14 and criteria 5 and 15.*	Pen Llyn a'r Sarnau SAC Afon Eden – Cors Goch Trawsfynydd SAC. Meirionnydd Oakwoods and Bats Sites SAC
(15) Projects which could introduce or increase or change the timing, nature of location of light or noise pollution	**Criterion 15 includes sites whose qualifying features are considered to be potentially sensitive to the effects of changes in light or noise that could be brought about by the project.** There is likely to be a temporary increase in noise pollution during the construction period through construction machnery and sheet piling activities. This could potentially cause a low level of disturbance to the otter, grey seal and bottlenose dolphin features of the Pen Llyn a'r Sarnau SAC, along with the otter feature of Afon Eden – Cors Goch Trawsfynydd SAC. However, there is already a high degree of disturbance in the vicinity of the proposals. Works would also be undertaken during daylight hours when otter activity is minimal. There would be no additional artificial lighting of the site.	Pen Llyn a'r Sarnau SAC Afon Eden – Cors Goch Trawsfynydd SAC. Meirionnydd Oakwoods and Bats Sites SAC

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
	As above, the proposed works are likely to create a temporary increase in noise levels during the course of the works, potentially impacting lesser horseshoe bats. Cofnod records do not indicate the presence of a lesser horseshoe bat roost within 1km of the proposed works. Effects on foraging bats would be minimal as works will be undertaken during daylight hours and there would be no artificial lighting of the site. Therefore, effects on otters from noise pollution on the Pen Llyn a'r Sarnau SAC and Afon Eden – Cors Goch Trawsfynydd SAC cannot be ruled out. Likewise, effects on lesser horseshoe bats from noise pollution on Meirionnydd Oakwoods and Bat Sites SAC also cannot be ruled out. *Note: There is a close link between criterion 15 and criteria 5 and 14 above.*	

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2.3 Initial outcome of site identification exercise

Following the initial high-level preliminary screening exercise provided by Table 3 above and Appendix A (full version including criteria screened out as well as those screened in), the number of potential threats and sites affected is reduced. Despite this, the nature of the criteria results in considerable overlap in some instances, such as in criteria 5, 14, and 15 which can all effectively be represented by 'disturbance / displacement of mobile species'. Criterion 1 and 3 effectively represent the threats caused by 'pollution' and 'habitat degradation'. These terms will therefore be used in any subsequent assessment, in place of the criteria in Table 3 above.

The outcomes of the site identification exercise are therefore shown in Table 4 below.

Table 4. Summary of potential threat mechanisms and European sites at risk

Potential threat	Relevant Criteria from Table 3	European sites
Pollution of marine environment (including foraging habitat for mobile species features)	(1) (3) and (5)	Pen Llyn a'r Sarnau SAC Afon Eden – Cors Goch Trawsfynydd SAC. Northern Cardigan Bay SPA
Habitat loss / degradation	(1) (3) and (5)	Pen Llyn a'r Sarnau SAC
Disturbance / displacement of mobile species feature	(5), (14) and (15)	Pen Llyn a'r Sarnau SAC Afon Eden – Cors Goch Trawsfynydd SAC. Meirionnydd Oakwoods and Bats Sites SAC

Table 4 above demonstrates that potential impacts on three European sites remain, and a formal screening assessment is therefore required.

3.0 SCREENING

3.1 Purpose

The purpose of the screening exercise determines whether or not a plan or project will lead to a 'likely significant effect' or, in other words, whether there is a risk that the proposed works will lead to effects that would 'undermine the conservation objectives' of the site and cannot be 'excluded on the basis of objective information'. An Appropriate Assessment is required when likely significant effects (that are credible and not hypothetical) are identified (or cannot be ruled out).

3.2 Approach

In order to complete the screening stage and identify any likely significant effects on site features, additional information is needed for each site at risk. The screening tables (Table 5 - 8) below therefore collate additional information for each site, including a site description and list of qualifying features, and use this to identify any likely significant effects from the proposed works (based on the threats listed in Table 4 above) and the site features potentially affected. The site-specific information provided in these tables has been collated from the Natural Resources Wales and JNCC websites. If necessary more detailed descriptions of the sites will be provided at the Appropriate Assessment stage, including the conservation objectives, but the information in Tables 5 - 6 below is sufficient for the screening stage.

In-depth analysis is not required at the screening stage as it should only operate as a 'trigger' to determine if an Appropriate Assessment is needed. Therefore, detailed examination of each of the conservation objectives of each of the features of the sites will not be undertaken at this stage, and is reserved for the Appropriate Assessment stage. Instead, this section only broadly explores whether it is possible that conservation objectives could be undermined and takes into account the risk of a potential significant effect.

As a result of the 'People Over Wind' decision, the screening stage is able to consider the essential features and characteristics of a project but is not able to take bespoke mitigation measures into account. The consideration of all mitigation for this project is therefore reserved for the Appropriate Assessment stage.

Table 5. Screening Assessment for the Pen Llyn a'r Sarnau SAC

Pen Llyn a'r Sarnau SAC (146,010.52 ha)	**UK0013117**
Qualifying features 1110 Sandbanks which are slightly covered by seawater all the time 1130 Estuaries 1150 Coastal Lagoons *****Priority Feature 1160 Large shallow inlets and bays 1170 Reefs 1140 Mudflats and sandflats not covered by sea water at low tide 1310 Salicornia and other annuals colonizing mud and sand 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) 8330 Submerged or partially submerged sea caves 1349 Bottlenose dolphin *Tursiops truncatus* 1355 Otter *Lutra lutra* 1364 Grey seal *Halichoerus grypus* Description The Pen Llŷn a'r Sarnau SAC encompasses areas of sea, coast and estuary that support a wide range of different marine habitats and wildlife. The nature of the seabed and coast and the range of	

environmental conditions present vary throughout the SAC. Differences in rock and sediment type, aspect, sediment movement, exposure to tidal currents and wave action, water clarity and salinity together with biological and food chain interactions have created a wide range of habitats and associated communities of marine plant and animal species, some of which are unique in Wales.

Potential Threats / Vulnerabilities

1) *Pollution of habitat features and foraging habitat for mobile species:*

It is possible that machinery and materials used for works on site could be a source of pollution, which could directly affect the adjacent intertidal mudflats and sandflats feature of the SAC and other marine / estuary habitats nearby. Construction activities could also result in increased sedimentation working within and around the water environment. The works are located immediately adjacent to and within the intertidal 'mudflats and sandflats' feature of the European site creating a potential direct pollution risk. The area is also part of the 'Estuaries' feature of the SAC. Due to the high dilution factor associated with a marine environment and the scale and nature of the proposed works, it is considered unlikely that any habitat further than c.500m away from the proposed works would suffer significant effects from pollution during construction. Therefore, effects on other SAC habitat features are scoped out.

It is considered highly likely that the estuary habitat adjacent to the proposed works is used occasionally for foraging by members of the otter population of the SAC. Cofnod records include foraging otters approx. 300m south of the proposals (2018). Deterioration in water quality and degradation of habitat could potentially impact on otters and could result in reduction of prey availability (fish). Although this poses a fairly low risk of having a significant effect on the conservation objectives of this feature due to the abundance of suitable foraging habitat elsewhere in the local area and the large range of the otter, it is included here as a likely significant effect on a precautionary basis.

Bottlenose dolphin and grey seal are likely to use the Mawddach Estuary entrance as foraging habitat, however both these species will forage widely and any decline in prey species in one area may not immediately impact the populations. As mentioned above, due to the scale and nature of the works proposed and the high dilution factor associated with the marine environment, any pollution impacts are likely to be local. It is therefore not considered likely that there will be significant effect on bottlenose dolphin and grey seal from pollution impacts.

Outcome: It is considered that the threat from pollution during construction could potentially undermine the conservation objectives of the site for intertidal mudflats and sandflats, estuaries, and otter features of the SAC and is therefore included as a likely significant effect.

2) *Habitat Loss / degradation*

The proposed works require the construction of a 750mm diameter surface water outfall pipe that will extend out from the sea wall, into the SAC habitat. This will result in loss of SAC habitat for the footprint of the pipe, outfall, and protective rock armour (approx. 84m2), and could lead to temporary degradation of immediate adjacent habitat during the construction phase.

As the proposed works require vehicle and machinery access through the SAC, the nature of the works could result in physical disturbance of intertidal habitats by construction vehicles. There is therefore a risk that this could lead to degradation and loss of SAC habitat adjacent to the sea wall that is being repaired and for the construction of the new surface water outfall pipe. There is a mosaic of intertidal habitat present within the harbour area where works are proposed, between the south facing sea wall and the north facing slipway. (See Appendix C which includes phase 1 habitat plan). The habitat in this area forms part of the SAC's 'mudflats & sandflats not covered by

seawater at low tide' habitat feature along with the overriding 'Estuaries' feature.

Although the scale of the proposed works is considered small in relation to the abundance of intertidal mudflats / sandflats and estuaries habitat in the area, further consideration of the impacts upon the conservation objectives are required.

Outcome: It is considered that the threat from habitat degradation and loss during construction could potentially undermine the conservation objectives of the site for intertidal mudflats and sandflats, and estuaries, features of the SAC and is therefore included as a likely significant effect.

3) Disturbance / displacement of mobile species features:

There are no Cofnod records of otter resting sites or holts within or in the vicinity of the proposed works area and none were recorded during the site survey undertaken February 2022 (Refer to Barmouth Viaduct Gardens Preliminary Ecological Appraisal, ARUP - May 2022). Due to the exposed nature of the site within a populated area of town and the high level of disturbance already experienced within this area, the presence of artificial lighting, and the tidal inundation of the beachfront, it is considered highly unlikely that the proposed works area would support potential holt opportunities or resting sites. However, otters are very likely to be present, at times, on the Mawddach Estuary habitat nearby whilst foraging and commuting.

There is likely to be some temporary noise pollution during the works, above current levels, which could potentially cause a low level of disturbance to foraging otters. This could cause a reduction in foraging opportunities for otter, thus potentially reducing access to food sources. However, such disturbance would be temporary and the works would be undertaken during daylight hours when otter activity is minimal. There would be no additional artificial lighting of the site.

As this risk is so minimal, no resting sites would be disturbed and even if an otter foraging during daylight hours was to be temporarily disturbed within the construction period, it is not considered realistic to imagine that this could have a signfiicant adverse effect on the conservation objectives of the otter feature of the SAC, given the availability of suitable foraging habitat elsewhere in the locality. This impact on otters is therefore scoped out of any further assessment.

The proposed works are likely to involve sheet piling activity, which is likely to cause increased disturbance as a result of noise, to the bottlenose dolphin and grey seal features of the SAC, if they are found to be present in the vicinity of the proposed works during construction. Artificially introduced hazards and reductions in the natural quality and suitability of bottlenose dolphin and grey seal habitat in the SAC can occur through noise and visual disturbance.

Due to no proposed works being carried out in the water column (avoiding tidal inundation to the work area), it is not considered likely that the proposal will have a likely significant effect. However, grey seals and bottlenose dolphin presence cannot be ruled out at this stage due to potential pathways. For this reason, at this current stage likely significant effect of the disturbance of grey seal and bottlenose dolphin associated with the SAC cannot be ruled out and are carried forward for appropriate assessment.

Outcome:
It is considered that the threat from disturbance during construction could potentially undermine the conservation objectives of the site for grey seal and bottlenose dolphin features of the SAC and is therefore included as a likely significant

Summary of Likely Significant Effects and Features requiring Appropriate Assessment

- Pollution of adjacent estuary and intertidal mudflats and sandflats habitat, including otter foraging habitat, during construction.
- Habitat loss / degradation as a result of physical disturbance of intertidal habitat.
- Disturbance of grey seals and bottlenose dolphins associated with the SAC during the construction phase of the works.

Table 6. Screening Assessment for the Meirionnydd Oakwoods and Bat Sites SAC

Meirionnydd Oakwoods and Bat Sites SAC (2812.79 ha)	**UK0014789**

Qualifying features

91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) *Priority Feature

3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

4010 Northern Atlantic wet heaths with *Erica tetralix*

4030 European dry heaths

9180 *Tilio-Acerion* forests of slopes, screes and ravines *Priority Feature

91D0 Bog woodland *Priority Feature

1303 Lesser horseshoe bat *Rhinolophus hipposideros*

Description

The Meirionnydd Oakwoods and Bat Sites SAC is made up of a series of woodlands, stretching from Dolgellau in the south to Eryri in the north. The majority of the SAC is classified as the woodland type known as "Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles", which covers approximately 84% of the SAC and is the dominant woodland type at most of the sites. A key feature of European importance is the rich Atlantic bryophyte communities that are often well developed within this Annex I type. These include numerous rare species, such as *Campylopus setifolius*, *Sematophyllum demissum*, *Adelanthus decipiens*, *Leptocyphus cuneifolius* and *Plagiochila atlantica*. Another key feature of the Meirionnydd Oakwoods and Bat Sites SAC is the lichen flora which is exceptionally rich and includes numerous rare species such as, *Micarea xanthonica*, *Parmelinopsis horrescens*, *Phyllopsora rosei*, *Micarea stipitata* and *Tyothallia biformigera*.

Frequently the oak woodland occurs as part of a mosaic of woodland types including other Annex I Habitats, "Bog woodland", "Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*" and "*Tilio-Acerion* forests of slopes, screes and ravines" which occur in small areas and are only significant at a few of the component SSSI/units. The transitions between these different woodland types are important in terms of maintaining the structure and function of the habitat type and vary across the U.K.

The heath is characterised by abundant *Calluna vulgaris*, *Ulex gallii* and *Erica cinerea* growing on thin, poor acidic soils. There are many small areas of dry heath interspersed amongst the woodland, which have not been measured, but the three largest areas of dry heath, together comprise 1% of the area of the SAC.

The feature "Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation" occurs within the Afon Glaslyn, within the Glaslyn SSSI and currently outside the SAC but within a proposed extension to the SAC.

Lesser horseshoe bats have over 20 known roosts within the SAC and forage widely within the SAC's woodlands, associated habitats and the surrounding countryside. The SAC includes maternity roost

sites in various types of buildings and structures, and winter hibernation sites, especially in mines. There are other types of roost such as night, transitional, leks and swarming sites, about which very little is known.

Potential Threats / Vulnerabilities

1) *Disturbance of mobile species feature: lesser horseshoe bat.*

The works will take place approximately 50m from the nearest SAC component. The proposed works are likely to create a temporary increase in noise levels during the course of the works. There are no Cofnod records of any lesser horseshoe bat roosts within 1km of the proposed works area. The proposed works to repair and strengthen the sea wall will not directly impact any potential lesser horseshoe bat roost features, as the species tend to roost in caves, or old buildings, churches, stables or barns. No potential roost features are present within the sea wall itself, and no trees with bat roost potential will be removed as part of the proposals. Therefore, there will be no loss of potential roosting habitat.

The area in the vicinity of the proposed works contain buildings and features that could potentially support roosting bats. However, the area is subject to an existing level of daily noise pollution with the presence of road traffic, railway, and boat/power craft activities. The proposed works are likely to cause a temporary increase in noise pollution levels during construction phase, although this is not considered likely to cause a significant effect. The presence of existing artificial lighting within and adjacent to the proposed works area will act as a deterrent to lesser horseshoe bats. Furthermore, as the works will be taking place during daylight hours, there is not likely to be any effect on foraging bats. The potential for the proposed works to disturb lesser horseshoe bats is therefore scoped out and not considered a likely significant effect.

Outcome: No likely significant effect

Summary of Likely Significant Effects and Features requiring Appropriate Assessment

- None

Table 7. Screening Assessment for the Afon Eden – Cors Goch Trawsfynydd SAC

Afon Eden – Cors Goch Trawsfynydd SAC (284.29 ha)	**UK0030075**
Qualifying features 7110 Active raised bogs *****Priority Feature 1029 Freshwater pearl mussel *Margaritifera margaritifera* 1831 Floating water-plantain *Luronium natans* 1106 Atlantic Salmon *Salmo salar* 1355 Otter *Lutra lutra* Description The Afon Eden/River Eden is a relatively unmodified river, mainly upland in character, of approximately 10km length. The watershed begins just south of Llyn Trawsfynydd, within an area of gently sloping and poorly drained land. The upper section of the catchment is slow-flowing with a number of deep pools along its length. In the lower two-thirds of the catchment the river flows more steeply into a narrow rocky gorge, with an adjacent area of forestry plantation, known as Coed y Brenin. The Afon Eden joins with the Afon Mawddach, just above the village of Ganllwyd, but the SAC boundary continues downstream to the tidal limit of the Mawddach at Llanelltyd. The Afon Eden is fed by a number of base-poor upland streams, which flow from the eastern flanks of	

the Rhinog mountains. The Ardudwy leat takes the most acidic waters from the eastern tributaries to Llyn Trawsfynydd. This water is used to maximise the water available for HEP generation by the Maentwrog Power Station.

The area receives high average rainfall, which has contributed to the development of raised bogs, blanket bog, and transition mires and quaking bogs. Two areas of raised bog occur at the top end of the catchment, close to the watershed, where they were once part of a much larger extent of bog, much of which is now flooded by Llyn Trawsfynydd. Transition mires and quaking bogs occur in waterlogged situations where they receive nutrients from the surrounding catchment as well as from rainfall. They are located within the wetlands surrounding the areas of raised bog.

The ecological structure and functions of the site are dependent on hydrological and geomorphological processes (often referred to as hydromorphological processes), the quality of riparian habitats and connectivity of habitats. Animals that are highly mobile such as migratory fish and otters, are also affected by factors operating outside the site.

The river contains the last known population of freshwater pearl mussels surviving in Wales, they are almost entirely confined to one section of the river. Historically the mussels were more widespread in the catchment. The mussels rely on salmonid parr hosting, for a short period of time, the glochidial larvae of the mussels on their gills, so the success of migratory and spawning fish in the catchment is crucial to their long-term survival. Atlantic salmon is also an important fish species that breeds in the Mawddach catchment.

In the slow-moving waters just upstream from Pont y Grible is a population of floating water plantain.

Potential Threats / Vulnerabilities

1) Pollution of supporting habitat outside SAC, impacting Atlantic Salmon and otter:

The Afon Eden – Cors Goch Trawsfynydd SAC is located approximately 11km to the east of proposals. The SAC is connected fluvially to the proposed works via the Afon Mawddach, however the SAC is located upstream of proposals. The tidal reach of the estuary reaches as far as 500m upstream of the Mawddach / Wnion confluence, therefore does not reach as far as the Afon Eden – Cors Goch Trawsfynydd SAC boundary. For this reason, and considering the scale and nature of the proposals, it is not likely that any pollution impacts from the proposed works would directly affect habitat within the SAC.

Otters are known to be widely distributed in the Mawddach catchment, and given that the species can have a range of between 20 – 30km it is highly likely that otters using habitat within the SAC would also be present in the vicinity of the proposed works at Barmouth. There is potential for the works to lead to temporary deterioration in water quality through increase in suspended solids from works next to the water environment, or from pollution through accidental spill from construction machinery. There is therefore the possibility of contamination of otter foraging habitat outside of the protected site, and a reduction in abundance and availability of prey for otters (fish).

Similarly, Atlantic Salmon is a feature of the Afon Eden – Cors Goch Trawsfynydd SAC and would be vulnerable to deterioration in water quality in the Afon Mawddach caused by any potential pollution event during the course of construction. Significant pollution to the Afon Mawddach could lead to mortality of Atlantic Salmon within the affected area, but could also act as a barrier to migrating Salmon moving up the catchment during spawning season. However, due to the high dilution factor associated with a marine environment and the scale and nature of the works proposed, it is considered highly unlikely that there would be significant effects from pollution within the estuary that would impact the Atlantic Salmon population. The threat of pollution and

habitat degradation upon the Atlantic Salmon feature is therefore not considered a likely significant effect.

Outcome: It is considered that the threat from pollution during construction could potentially undermine the conservation objectives of the site for otter and is therefore a likely significant effect for this feature only.

2) Disturbance of mobile species features – Otter:

The Afon Eden – Cors Goch Trawsfynydd SAC supports a population of otters which will range within and beyond the boundaries of the SAC to feed and commute using the waterways and riparian land to feed, rest and breed. Otters are known to be widely present in the Mawddach catchment.

There are no Cofnod records of otter resting sites or holts within or in the vicinity of the proposed works area. Due to the exposed nature of the site within a populated area of town and the high level of disturbance already experienced within this area, the presence of artificial lighting, and the tidal inundation of the beachfront, it is considered highly unlikely that the proposed works area would support potential holt opportunities or resting sites. However, otters are very likely to be present, at times, on the Mawddach Estuary habitat nearby, whilst foraging and commuting.

There would be some localised temporary noise pollution during the works, above current levels, which could potentially cause a low level of disturbance to foraging otters. However, this would be minimal and the works would be undertaken during daylight hours when otter activity is minimal. There would be no additional artificial lighting of the site.

As this risk is so minimal, no resting sites would be disturbed and even if an otter foraging during daylight hours was to be temporarily disturbed within the construction period, it is not considered realistic to imagine that this could have a significant adverse effect on the conservation objectives of the otter feature of the SAC. This impact on otters is therefore scoped out of any further assessment.

Outcome: No likely significant effect

Summary of Likely Significant Effects and Features requiring Appropriate Assessment

- Pollution of supporting habitat outside SAC: Otter.

Table 8. Screening Assessment for Northern Cardigan Bay SPA

Northern Cardigan Bay SPA (82312 ha)	**UK9020327**
Qualifying features Red Throated Diver *Gavia stellata* Description Northern Cardigan Bay / Gogledd Bae Ceredigion SPA, as the name suggests occupies the northern half of Cardigan Bay on the west coast of Wales. Several rivers flow into the northern part of Cardigan Bay including the Dwyfach, Glaslyn/Dwyryd, Wnion, Dysynni, Leri, Mawddach and Dyfi. The coastline is dominated by rocky cliffs and shores with	

occasional sandy beaches and estuaries. Where estuaries flow into northern Cardigan Bay, the sea quickly becomes more than 20 metres deep, but elsewhere remains shallow (less than 10 m deep) for up to 20 km offshore. These shallow areas are sub-tidal shingle reefs, known as the sarnau. All three of the sarnau lie roughly north-east to south-west and are presumed to be formed from glacial deposits left at the end of the last ice age. Sarn Badrig is the largest and most northerly sarn, running parallel with the Llŷn Peninsula from Harlech up to 24 km offshore. Sarn y Bwlch is the smallest sarn, starting from near Tywyn. Sarn Cynfelyn, the most southerly sarn, starts from north of Aberystwyth. These shallow reefs are important ecological habitats within the Northern Cardigan Bay / Gogledd Bae Ceredigion SPA and are important features of the Pen Llŷn a'r Sarnau Special Area of Conservation (SAC), designated under the EC Habitats and Species Directive.

The two tidal streams that enter the Irish Sea, from the north near the Isle of Man and the south through the St George's Channel, meet in the vicinity of Cardigan Bay resulting in weak tidal currents in the area. The tidal range in the bay is up to 4m at a spring tide.

Potential Threats / Vulnerabilities

1) *Pollution of marine environment outside SPA (including foraging habitat for mobile species features)*

The SPA is located 3.5km west of the proposals. Although the site is hydrologically connected to the proposed works, given the nature and scale of the proposals and the dilution factor associated with the marine environment, it is considered highly unlikely that a pollution event during construction could impact the SPA itself. However, any localised pollution contamination could potentially impact upon the SPA's mobile species feature, the red throated diver, which could potentially be present the marine environment in the vicinity of the proposals for foraging.

It is considered unlikely that any habitat further than c.500m away from the proposed works would suffer significant effects from pollution during construction, therefore any such contamination would be localised in nature. This could potentially effect upon feeding grounds and prey availability of the red throated diver, however, given the availability of suitable habitat elsewhere and the large range of this species, it is not considered likely that this poses a significant threat to the conservation objective of this feature.

Outcome: No likely significant effect

Summary of Likely Significant Effects and Features requiring Appropriate Assessment

- None

Evidence provided in Tables 5 – 8 above allows the likely significant effects to European sites to be broken down into threats to specific features of the sites identified, with some features being screened out of any further assessment. Therefore, Table 9 below summarises the results of this screening exercise, listing the European sites identified as being at risk from the proposed works, the likely significant effects and the features of each of the sites that could be affected.

Table 9. Summary of Screening Exercise

European Site	Likely Significant Effects and Features at Risk Likely		
	Pollution of habitat features and foraging habitat	*Habitat loss / degradation through construction works*	*Disturbance / displacement of mobile species*
Pen Llyn a'r Sarnau SAC	• Intertidal Mudflats and Sandflats • Estuaries • Otter	• Intertidal Mudflats and Sandflats • Estuaries	• Grey seal • Bottlenose dolphin
Afon Eden – Cors Goch Trawfynydd SAC	• Otter		

4.0 FORMAL SCREENING OPINION

The proposed improvement has been screened according to the statutory procedures laid out in the Habitats Regulations 2017 (as amended) using the methodology outlined in the Habitats Regulations Assessment Handbook.

The screening exercise concluded that likely significant effects (LSE) could not be ruled out for the Pen Llyn a'r Sarnau SAC and Afon Eden – Cors Goch Trawsfynydd SAC due to the reasons outlined in Tables 5 and 7 above and summarised in Table 9 above. Therefore, an appropriate assessment is required for these likely significant effects.

5.0 APPROPRIATE ASSESSMENT

5.1 Purpose

Where a project is likely to have a significant effect, the precautionary principle emphasises that consent can only be granted if the competent authority can ascertain that the proposed improvement will not adversely affect the integrity of the European site, following an appropriate assessment. This is the purpose of the appropriate assessment stage.

In accordance with the 'People Over Wind' ruling, the appropriate assessment takes any incorporated mitigation measures into account that are sufficient to remove the likely significant effect. Conversely, if mitigation measures are not proposed, or prove to be inadequate, they can be imposed by the competent authority via conditions or other planning tools.

The role of mitigation is different to that of compensation. Mitigation measures aim to avoid, remove or reduce significant effects on European sites, whereas compensation is only considered under the derogations at the later stages of the HRA if required.

The HRA Handbook outlines the definition of integrity in contemporary planning policy and states that for a consent-making body to conclude the absence of an adverse effect, then it should be 'convinced' that no reasonable scientific doubt remains. As defined by the CJEU (Sweetman) and European Commission, the integrity of the site is 'the lasting preservation of the constitutive characteristics of the site'. For further definitions see Section 1.5 above.

5.2 Approach

The screening assessment found that likely significant effects could not be ruled out for three features of the Pen Llyn a'r Sarnau SAC and the otter feature of the Afon Eden – Cors Goch Trawsfynydd SAC.

These issues are individually subject to further scrutiny through an appropriate assessment (Table 10, 11 and 12 below), which considers the site's conservation objectives for the features that have been screened into the assessment (see Table 9 above). Individual effects are assessed with and without mitigation, concluding with an individual Integrity Test including an assessment of whether any residual effects remain with mitigation in place. A list of the mitigation measures proposed is included in Table 13. If no adverse effect on integrity is recorded but residual effects do remain, an in-combination assessment is likely to be required. If an adverse effect on the integrity of the site remains, the assessment would have to proceed to the derogations, or stages 3 and 4 of HRA (see Table 1 and Figure 4 in Section 1 above).

Following an in-combination assessment of any residual effects (if required), an overall Formal Integrity Test for the proposed works will be reported.

Information about the qualifying features of the sites has been obtained from the JNCC and NRW web-sites.

Table 10. Appropriate Assessment for Pollution Impacts

Pen Llyn a'r Sarnau SAC (146,010.52 ha)	Features at risk Estuaries Intertidal Mudflats and Sandflats Otter (*Lutra lutra*)
Afon Eden – Cors Goch Trawsfynydd SAC (284.29ha)	Features at risk: Otter *(Lutra lutra)*

Assessment without mitigation

The Pen Llyn a'r Sarnau SAC supports a number of estuarine and marine habitats and species, and the proposed works will take place directly within and adjacent to the SAC, with machinery access through the SAC required. Much of the SAC is marine but extensive intertidal areas are also included. Of the nine habitats for which the site is designated, those in closest proximity to the proposals include 'mudflats and sandflats not covered by seawater at low tide' which is present within and adjacent to the proposed works area, and the broader 'estuaries' habitat which covers the whole of the Mawddach Estuary area.

The Pen Llyn a'r Sarnau SAC is also designated for a number of qualifying species, including its population of otters, which are known to range far and wide within and beyond the boundaries of the SAC to forage, breed, rest and commute. Whilst predominantly aquatic, they will use riparian land for foraging and resting and are susceptible to disturbance or changes in prey availability. Consequently, the presence and availability of resting places, food and freshwater, are key factors in the maintenance of the overall population.

The Afon Eden – Cors Goch Trawsfynydd SAC is designated for its raised bog and blanket bog habitats along with the Afon Eden which is a relatively unmodified river, mainly upland in character. The Afon Eden, approximately 10km, flows from just south of Llyn Trawsfynydd, down toward the village of Ganllwyd where it joins with the Afon Mawddach. The SAC boundary continues downstream to the tidal limit of the Mawddach at Llanelltyd, where the Mawddach flows into the Pen Llyn a'r Sarnau SAC boundary, approx. 11km upstream (east) of the proposals. The ecological structure and functions of the site are dependent on hydrological and geomorphological processes, the quality of riparian habitats and connectivity of habitats. Species that are highly mobile, such as migratory fish and otters, are also affected by factors operating outside the site.

Like the Pen Llyn a'r Sarnau SAC, Otter is also a qualifying species for the Afon Eden - Cors Goch Trawsfynydd SAC. It can be presumed, given the distances involved and the wide-ranging behaviour of the species, and the fact that the site is within the same catchment as the proposals, that otters in the vicinity of the proposals will form part of the Afon Eden – Cors Goch Trawsfynydd SAC population.

As reported in the screening stage (Section 3) of this HRA, it is possible that the machinery and materials used for the proposed works on site could be a source of pollution, which could directly affect the habitat and species features discussed above. Such pollution incidents would cause localised pollution of the immediate habitat and water environment, and depending on the scale, flows and tides at the time, could spread both upstream and downstream. There is a risk therefore of pollution causing degradation of habitat features within and adjacent to the works. Likewise, it is possible that any contamination of the intertidal habitat could lead to a reduction in prey availability for the local otter population.

Unmitigated, any pollution release to the environment could potentially undermine conservation objectives of the habitats and otter features of Pen Llyn a'r Sarnau SAC, along with the otter feature

of the Afon Eden-Cors Goch Trawsfynydd SAC. However, due to the small scale and temporary nature of the work, any pollution incident is likely to be relatively small in scale and there would be a high degree of dilution and dispersion within the marine water environment of the estuary, particularly during tidal cycles. With this in mind, any effects are likely to be short-term. The likelihood of significant effects on these habitat and species features through contamination is low, however, without mitigation, residual effects could be considered to remain.

Conclusion

Without any mitigation measures in place, there is some risk to the intertidal mudflats and sandflats, estuaries, and otter features of the identified sites from pollution contamination. Conservation objectives (i)(ii)(iii) (as listed in the table below) of Pen Llyn a'r Sarnau SAC's habitat features could potentially by compromised. Conservation Objective (iii) of Pen Llyn a'r Sarnau SAC's otter feature, along with Conservation Objective (i) of Afon Eden – Cors Goch Trawsfynydd's otter feature could also be compromised. Therefore, an adverse effect on the integrity of these sites due to pollution cannot be ruled out without mitigation in place.

Assessment with Mitigation

Given that adverse effects have been identified, this assessment must consider if mitigation measures incorporated within the scheme can provide the competent authority with 'certainty' that no reasonable scientific doubt remains as to the absence of an effect upon the integrity of the European site.

Each of the mitigation measures is considered to cover the criteria identified in the DTA HRA Handbook, namely effectiveness, reliability, timeliness, deliverability, enforcibility and likelihood they will be maintained and persist for however long is necessary. This HRA does not make any distinction between embedded elements of the design that may provide ecological benefits that are secondary to their primary purpose and the bespoke measures specifically designed to avoid, cancel or reduce the impact of the development on site features.

The control of pollution and similar incidents forms a frequent component of most large-scale developments. Consequently, a range of tried and trusted techniques can be adopted to reduce the risk of such events to an acceptably low level or remove them entirely even where sensitive European sites are concerned. This provides a high degree of confidence that they will be successful.

Application of mitigation measures:

Mitigation measures are included in full in Table 10 below, but those involved with reducing or avoiding the potential impact from pollution and habitat degradation can be summarised as follows:

- Contractor to prepare and adhere to a Construction Environment Management Plan (CEMP) which will detail what measures will be in place to protect the surrounding environment. Location of adjacent protected sites shall be clearly highlighted.
- Materials stored on site shall be located more than 10m away from watercourses or estuary habitat at all times.
- Pollution spill kits to be readily available on site and in plant/machinery at all times, with staff suitably trained in how to deploy.
- Contractor to have emergency incident response procedure in place in the case of a spillage.
- Contractor to adhere to pollution prevention best practice guidelines, including;
  - PPG1: Understanding your environmental responsibilities.

- GGP5: Works and maintenance in or near water.
- PPG6: Working at construction and demolition sites.
- GPP21: Pollution response planning.
- GPP22: Dealing with spills.

- Biodegradable lubricant and hydraulic oil to be used in plant machinery where possible. Biodegradable oils are less toxic than most synthetic oil but should still be stored to the same standards as other oils and prevented from entering the water environment.
- Works to take place at low tide conditions only. No works to be completed within the intertidal area when the adjacent mudflat and sandflats are inundated with seawater.
- Any excess concrete material or wash-water shall be fully and securely contained and disposed of appropriately off site
- All concreting works to take place at low tide conditions, allowing sufficient time for concrete to set prior to any potential tidal inundation. Curing accelerators to be used where necessary.
- Contractor to monitor tidal and weather conditions / forecasts and plan work accordingly

Conclusion
With these mitigation measures in place it is considered that the risk is reduced to the extent that there would be no adverse effect on the integrity of the Pen Llyn a'r Sarnau SAC and Afon Eden Cors Goch Trawsfynydd SAC, with no residual effects on any of the Conservation Objectives of the features of these sites.

Table 11. Appropriate Assessment for habitat degradation and loss through construction works.

Pen Llyn a'r Sarnau SAC (146,010.52 ha)	Features at risk Estuaries Intertidal Mudflats and Sandflats
Assessment without mitigation	
The proposed improvement works to the sea wall and new surface water outlet installation will take place within and directly adjacent to the SAC. Due to the location of the works, machinery access will be required along the foreshore from the north facing slipway located approx. 40m south west of the Viaduct Gardens sea wall. Excavation works for the sea wall and placement of rock armour will take place within the intertidal area, directly adjacent to the SAC. Excavation works and construction associated with the installation of the surface water outfall will take place within the SAC. Of the nine habitats for which the site is designated, those in closest proximity to the proposals include 'mudflats and sandflats not covered by seawater at low tide' which is present within and adjacent to the proposed works area, and the broader 'estuaries' habitat which covers the whole of the Mawddach Estuary area. An intertidal biotope survey was undertaken in the area during March 2022. (Refer to *Barmouth*	

Viaduct Gardens Intertidal Biotope Report, ARUP, 2022). The report summarises the intertidal habitat in front of the Viaduct Gardens frontage wall as follows:
The characteristics of the habitat here resemble predominant areas of intertidal bare sand with patchy areas of shingle and cobbles. The rock armour and viaduct pillars have been colonised by sparse lichen and patches of green alga. Lower down on the shore, small intertidal rocks and boulders are present, colonised by brown and green algae
A relatively broad range of commonly occurring species were observed; including the following, SACFOR abundance denoted as [#]:

• Algae - Chlorophyta (green seaweeds): *Ulva enteromorpha* [O] (gutweed).
• Algae - Ochrophyta: Phaeophyceae (brown seaweeds): *Fucus spiralis* [C] (spiral wrack*), Pelvetia canaliculata* [C] (channelled wrack), *Fucus vesiculosus* (bladderwrack) [C], *Fucus ceranoides* (horned wrack) [O], *Ascophyllum nodosum* [O] (knotted wrack).
• Crustacea - *Semibalanus balanus* [A] (acorn barnacle), *Austrominius modestus* [R] (Darwin's barnacle – Invasive Non-Native Species).
• Chordata: Pisces: Osteichthyes (fish) – *Lipophrys pholis* [P] (shanny), *Pholis gunnellus* [P] (butterfish).
• Mollusca - *Littorina littorea* [C] (common periwinkle).

Due to the requirements for machinery access and construction activities within the intertidal mudflats and sandflats / estuary habitat during the proposed works there is a threat of habitat degradation and loss. In order to access the intertidal area in front of the sea wall, construction plant and machinery will need to track across the harbour foreshore from the main harbour slipway. This could cause rutting and compaction of the intertidal mudflat and sandflat habitat in this area, which could harm invertebrates within the habitat. However, it is recognised that areas of the harbour will already be subject to such disturbance, as vessels are regularly launched or recovered via the slipway. Similarly, excavating areas of this intertidal habitat in order to undertake the works could lead to habitat degradation, particularly if the areas are not restored appropriately. Any such degradation is only likely to have minimal impact on the habitat features of the SAC due to the small scale and temporary nature of the works and the abundance of these habitat features in the surrounding area.

The installation of the new surface water outfall pipe, which will extend out into SAC habitat, will result in permanent loss of habitat for the footprint of the pipe structure (approx. 84m^2). This will result in loss of (0.008ha) of the SAC's intertidal mudflat and sandflat habitat which constitutes part of the 'mudflats and sandflats not covered by seawater at low tide' feature of the Pen Llyn a'r Sarnau SAC and also represents a sub-feature of the 'estuary' feature of the same SAC. Given that the total area of intertidal mudflat and sandflat habitat in the SAC is in the region of 3358ha, the loss of 0.008ha (representing 0.0002%) is not considered to be significant, and would not have an adverse effect on the integrity of the Pen Llyn a'r Sarnau SAC. However, as the impact from permanent loss of habitat cannot be mitigated, residual effects would remain.

<u>Conclusion</u>

Without any mitigation measures in place, there is some risk to the intertidal mudflats and sandflats, and estuaries features of the Pen Llyn a'r Sarnau SAC from habitat degradation and loss through construction activities. Conservation objectives (i)(ii)(iii) (as listed in the table below) of Pen Llyn a'r Sarnau SAC's habitat features could potentially be compromised. Therefore, an adverse effect on the integrity of these sites cannot be ruled out without mitigation in place.

Assessment with Mitigation

Given that adverse effects have been identified, this assessment must consider if mitigation measures incorporated within the scheme can provide the competent authority with 'certainty' that no

reasonable scientific doubt remains as to the absence of an effect upon the integrity of the European site.

Each of the mitigation measures is considered to cover the criteria identified in the DTA HRA Handbook, namely effectiveness, reliability, timeliness, deliverability, enforcibility and likelihood they will be maintained and persist for however long is necessary. This HRA does not make any distinction between embedded elements of the design that may provide ecological benefits that are secondary to their primary purpose and the bespoke measures specifically designed to avoid, cancel or reduce the impact of the development on site features.

Application of mitigation measures:
Mitigation measures are included in full in Table 10 below, but those involved with reducing or avoiding the potential impact of habitat degradation from construction activites can be summarised as follows:

- Materials stored on site shall be located more than 10m away from watercourses or estuary habitat at all times.
- Works to take place at low tide conditions only. No works to be completed within the intertidal area when the adjacent mudflat and sandflats are inundated with seawater.
- Access to and along the intertidal area to be via the main harbour slipway and along a designated pathway to keep potential habitat disturbance to a minimum.
- Bog mats to be used under plant/machinery in any soft parts of the intertidal areas to reduce potential compaction impacts.
- There shall be no access to mid – to lower shore where trafficking of vehicles may directly impact sensitive marine habitats.
- Excavations to be backfilled in same layers as they were removed, so that the top 1m layer of sediment removed goes back in at this level, and anoxic materials lower down is returned to the bottom of the excavations. This will aid recovery of the habitat following excavation works.
- Beach material excavated for the pipe is to be placed within the surrounding intertidal area and not taken from site.
- Beach levels to be restored around the new pipe once construction work is complete, using existing excavated beach material.

Conclusion
With these mitigation measures in place it is considered that the risk is reduced to the extent that there would be no adverse effect on the integrity of the Pen Llyn a'r Sarnau SAC. However, residual effects do remain due to the minor loss of habitat, which cannot be mitigated.

Table 12. Appropriate Assessment for disturbance / displacement of mobile species

Pen Llyn a'r Sarnau SAC (146,010.52 ha)	Features at risk Bottlenose Dolphin *Tursiops truncatus* Grey Seal *Halichoerus grypus*
Assessment without mitigation	

The proposed works to the sea wall will be carried out from dry land however aspects of the works will need to be carried out from the foreshore, during low tide conditions. As the construction method of the sea wall is sheet pilling, it poses a potential to cause underwater noise, specifically impacting on any grey seals and bottlenose dolphins that could be present in the vicinity of the proposed works from the Pen Llŷn a'r Sarnau SAC.

The proposed works are likely to involve the installation of sheet piling, which is likely to cause increased disturbance as a result of noise, to the bottlenose dolphin and grey seal features of the SAC, if they are found to be present in the vicinity of the proposed works during construction. Artificially introduced hazards and reductions in the natural quality and suitability of bottlenose dolphin and grey seal habitat in the SAC can occur through noise and visual disturbance.

The activity has the potential to increase anthropogenic underwater noise in the marine environment in the vicinity of the proposed works, albeit temporarily during construction. This could potentially alter the behaviour of the bottlenose dolphin and grey seal should they be present in the area. Such occurrence may temporarily displace these species from important feeding habitat whilst pile driving activity is taking place. In a recent study on bottlenose dolphins in the Moray Firth (in relation to the construction of the Nigg Energy Park in the Cromarty Firth), small effects of pile driving on dolphin presence have been observed, however, dolphins were not excluded from the vicinity of the piling activities (Graham et al. 2017). The pile driving resulted in a slight reduction of the presence, detection positive hours and the encounter duration for dolphins within the Cromarty Firth, however, this response was only significant for the encounter durations. Encounter durations decreased within the Cromarty Firth (though only by a few minutes) and increased outside of the Cromarty Firth on days of piling activity. These data highlight a small spatial and temporal scale disturbance to bottlenose dolphins as a result of impact piling activities.

Due to the availability of other suitable habitat within the SAC and the temporary nature of the works it is not considered likely that the proposals will have a significant likely effect. However, grey seals and bottlenose dolphin presence cannot be ruled out.

Observations of bottlenose dolphins in the SAC have recorded centres of activity in Tremadog Bay, at the entrances to estuaries and also close to some of the Sarnau reefs, indicating the catchments of the freshwater tributaries entering the site together with the offshore reefs contribute to the overall site integrity for the species (NRW, 2018).

No grey seals have been historically recorded in the vicinity of the works according to a Cofnod search of the site. In areas that have high incidence of human presence through coastal walking, boating, fishing or other activity, the grey seal is generally not seen hauled out. It is therefore not considered likely that the proposals will have a significant effect upon potential grey seal haul-out habitat.

<u>Conclusion</u>

Without any mitigation measures in place, there is some risk to the bottlenose dolphin and grey seal features of the Pen Llyn a'r Sarnau SAC from disturbance and displacement through construction activities and noise. Conservation objectives (i)(ii)(iii) (as listed in the table below) of Pen Llyn a'r Sarnau SAC's species features could potentially by compromised. Therefore, an adverse effect on the integrity of these sites cannot be ruled out without mitigation in place.

Assessment with Mitigation

Given that adverse effects have been identified, this assessment must consider if mitigation measures incorporated within the scheme can provide the competent authority with 'certainty' that no reasonable scientific doubt remains as to the absence of an effect upon the integrity of the European

site.

Each of the mitigation measures is considered to cover the criteria identified in the DTA HRA Handbook, namely effectiveness, reliability, timeliness, deliverability, enforcibility and likelihood they will be maintained and persist for however long is necessary. This HRA does not make any distinction between embedded elements of the design that may provide ecological benefits that are secondary to their primary purpose and the bespoke measures specifically designed to avoid, cancel or reduce the impact of the development on site features.

Application of mitigation measures:
Mitigation measures are included in full in Table 10 below, but those involved with reducing or avoiding the potential impact of mobile species disturbance / displacement from construction activites can be summarised as follows:

- Pilling and other related construction works shall occur in dry conditions only;
- Pilling will cease and standing time will be implemented during high tide;

With the implementeation of the above mitigation measures in place, no works (inlcuding pile driving activity) will take place in the water colum. This will reduce the distance in which such anthropogenic noise will carry into the marine environment.

Conclusion
With these mitigation measures in place it is considered that the risk is reduced to the extent that there would be no adverse effect on the integrity of the Pen Llyn a'r Sarnau SAC, with no residual effects on any of the Conservation Objectives of the features of the site.

Conservation objectives

Impact on Conservation Objectives – Pen Llyn a'r Sarnau SAC	
Conservation Objectives for 'Mudflats and Sandflats not covered by seawater at low tide' and Estuaries'. The vision for this feature is for it to be in favourable conservation status, where all the following conditions are satisfied:	**Outcome**
(i) The overall distribution and extent of the habitat features within the site, and each of their main component parts is stable or increasing. For the intertidal mudflat and sandflat feature these include: - Mya arenaria and polychaetes in muddy gravel - Eel grass Zostera marina beds - Muddy gullies in the Mawddach estuary. For estuaries this includes the stability of sandy sediments in proportion to the muddy sediments. Restoration and recovery As part of this objective it should be noted that; for the estuaries feature additional land which should form an integral part of the estuarine ecosystem should be restored.	No adverse effect on integrity; residual effects remain in terms of conservation objective (i)

(ii)	The physical, biological and chemical structure and functions necessary for the long-term maintenance and quality of the habitat are not degraded. Important elements include: - geology - sedimentology - geomorphology, - hydrography and meteorology - water and sediment chemistry - biological interactions. This includes a need for nutrient levels in the water column and sediments to be: - at or below existing statutory guideline concentrations - within ranges that are not potentially detrimental to the long-term maintenance of the features species populations, their abundance and range. Contaminant levels in the water column and sediments derived from human activity to be: - at or below existing statutory guideline concentrations - below levels that would potentially result in increase in contaminant concentrations within sediments or biota - below levels potentially detrimental to the long-term maintenance of the feature species populations, their abundance or range taking into account bioaccumulation and biomagnification. <u>Restoration and recovery</u> As part of this objective it should be noted that; for the estuaries feature the structure and functions of the estuaries that have been damaged/degraded by the constraints of artificial structures such as flood banks, are restored.	No adverse effect on integrity; No residual effects
(iii)	The presence, abundance, condition and diversity of typical species are such that habitat quality is not degraded. Important elements include: - species richness, - population structure and dynamics, - physiological heath, - reproductive capacity, - recruitment, - mobility, - range.	No adverse effect on integrity; No residual effects

Conservation Objectives for 'Otter', 'Bottlenose dolphin' and 'Grey seal' To achieve favourable conservation status, all the following, subject to natural processes, need to be fulfilled and maintained in the long-term:	Outcome
(i) The population is maintaining itself on a long-term basis as a viable component of its natural habitat. Important elements include: • population size • structure, production • condition of the species within the site. As part of this objective it should be noted that for bottlenose dolphin and grey seal; • Contaminant burdens derived from human activity are below levels that may cause physiological damage, or immune or reproductive suppression For grey seal populations should not be reduced as a consequence of human activity.	No adverse effect on integrity; No residual effects
(ii) The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future. (iii) As part of this objective it should be noted that for bottlenose dolphin and grey seal: • Their range within the SAC and adjacent inter-connected areas is not constrained or hindered • There are appropriate and sufficient food resources within the SAC and beyond • The sites and amount of supporting habitat used by these species are accessible and their extent and quality is stable or increasing	No adverse effect on integrity; No residual effects
(iv) The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing. Important considerations include; • distribution • extent • structure • function and quality of habitat • prey availability and quality. As part of this objective it should be noted that; • The abundance of prey species subject to existing commercial fisheries needs to be equal to or greater than that required to	No adverse effect on integrity; No residual effects

achieve maximum sustainable yield and secure in the long term. • The management and control of activities or operations likely to adversely affect the species feature is appropriate for maintaining it in favourable condition and is secure in the long term. • Contamination of potential prey species should be below concentrations potentially harmful to their physiological health. • Disturbance by human activity is below levels that suppress reproductive success, physiological health or long-term behaviour • There are sufficient sources within the SAC and beyond of high quality freshwater for drinking and bathing.	
Populations should be increasing.	No adverse effect on integrity; No residual effects

Impact on Conservation Objectives – Afon Eden - Cors Goch Trawsfynydd SAC	
Conservation Objectives for '*Otter*'	Outcome
(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.	No adverse effect on integrity; No residual effects
(ii) The natural range of otters in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. The natural range is taken to mean those reaches that are potentially suitable to form part of a breeding territory and/or provide routes between breeding territories. A number of potential and breeding sites have been identified (Lyles, 2006) in the upper reaches of the Afon Eden. The size of breeding territories may vary depending on prey abundance.	No adverse effect on integrity; No residual effects
(iii) The population size should not be limited by the availability of suitable undisturbed breeding sites. Where these are insufficient they should be created through habitat enhancement and where necessary the provision of artificial holts. No otter breeding site is subject to a level of disturbance that could have an adverse effect on breeding success. Where necessary, potentially harmful levels of disturbance are managed. Survey information shows that otters are widely distributed in the Mawddach catchment.	No adverse effect on integrity; No residual effects
(iv) The safe movement and dispersal of individuals around the SAC is facilitated by the provision, where necessary, of suitable riparian habitat, and underpasses, ledges, fencing etc at road bridges and other artificial barriers.	No adverse effect on integrity; No residual effects
(v) All factors affecting the achievement of these conditions are under control.	No adverse effect on integrity; No residual effects

Integrity Test

Integrity test:	Pollution Impacts: Without mitigation there is a low risk of pollution leading to degradation of habitats and species adjacent to the proposed works area. This could potentially undermine Conservation Objectives of two habitat features and one species feature of the Pen Llyn a'r Sarnau SAC and one species feature of Afon Eden – Cors Goch Trawsfynydd SAC. However, when the proposed mitigation measures are taken into account, it is considered that the risk would be reduced sufficiently to consider that there would be no adverse effect on the integrity of these protected sites, with no residual effects. Habitat loss/degradation impacts: Permanent loss of approx. 0.002ha of habitat from the 'Intertidal mudflats and sandflats' and 'Estuary' features of the Pen Llyn a'r Sarnau SAC does contravene the conservation objectives of the site but it is not considered to represent an adverse effect on the integrity of the site. As no mitigation is possible residual effects remain. Without mitigation there is a risk of construction activities such as plant/vehicle movement and excavation activities leading to habitat degradation within the intertidal area adjacent to the proposed works (away form the footprint of the works itself). This could potentially undermine Conservation Objectives for two habitat features of the Pen Llyn a'r Sarnau SAC. However, when the proposed mitigation measures are taken into account, it is considered that the risk would be reduced sufficiently to consider that there would be no adverse effect on the integrity of the protected site, with no residual effect. Disturbance impacts: Without mitigation there is a risk of construction activities, such as pile driving, leading to disturbance and displacement of mobile species that may be present in the marine environment in the vicinity of the proposed works. This could potentially undermine Conservation Objectives for two species features of the Pen Llyn a'r Sarnau SAC. However, when the proposed mitigation measures are taken into account, it is considered that the risk would be reduced sufficiently to consider that there would be no adverse effect on the integrity of the protected site, with no residual effect.
Residual effects / In combination:	Residual effects remain due to the small-scale loss from two features of the Pen Llyn a'r Sarnau SAC, which cannot be mitigated. Therefore, the residual effects will need to be assessed in-combination with other relevant projects.

Table 13. Mitigation Measures Proposed to Reduce or Avoid Impacts on European Sites

Mitigation Proposed	Impact Reduced/Avoided	European Site Affected	Site Features Affected
• Contractor to prepare and adhere to a Construction Environment Management Plan (CEMP) which will detail what measures will be in place to protect the surrounding environment. Location of adjacent protected sites shall be clearly highlighted. • Materials stored on site shall be located more than 10m away from watercourses or estuary habitat at all times. • Pollution spill kits to be readily available on site and in plant/machinery at all times, with staff suitably trained in how to deploy. • Contractor to have emergency incident response procedure in place in the case of a spillage. • Contractor to adhere to pollution prevention best practice guidelines, including; - PPG1: Understanding your environmental responsibilities. - GGP5: Works and maintenance in or near water. - PPG6: Working at construction and demolition sites. - GPP21: Pollution response planning. - GPP22: Dealing with spills. • Biodegradable lubricant and hydraulic oil to be used in plant machinery where possible. Biodegradable oils are less toxic than most synthetic oil but should still be stored to the same standards as other oils and prevented from entering the water environment. • Works to take place at low tide conditions only. No works to be completed within the intertidal area when the adjacent mudflat and sandflats are inundated with seawater. • Any excess concrete material or wash-water shall be fully and securely contained and disposed of appropriately off site • All concreting works to take place at low tide conditions, allowing sufficient time for concrete to set prior to any potential tidal inundation. Curing accelerators to be used where necessary. • Contractor to monitor tidal and weather conditions / forecasts and plan work accordingly	Pollution of marine environment and otter foraging habitat.	Pen Llyn a'r Sarnau SAC Afon Eden – Cors Goch Trawfynydd SAC.	Estuaries Intertidal Mudflats and Sandflats Otter Otter

• Materials stored on site shall be located more than 10m away from watercourses or estuary habitat at all times. • Works to take place at low tide conditions only. No works to be completed within the intertidal area when the adjacent mudflat and sandflats are inundated with seawater. • Access to and along the intertidal area to be via the main harbour slipway and along a designated pathway to keep potential habitat disturbance to a minimum. • Bog mats to be used under plant/machinery in any soft parts of the intertidal areas to reduce potential compaction impacts. • There shall be no access to mid – to lower shore where trafficking of vehicles may directly impact sensitive marine habitats. • Excavations to be backfilled in same layers as they were removed, so that the top 1m layer of sediment removed goes back in at this level, and anoxic materials lower down is returned to the bottom of the excavations. This will aid recovery of the habitat following excavation works. • Beach material excavated for the pipe is to be placed within the surrounding intertidal area and not taken from site. • Beach levels to be restored around the new pipe once construction work is complete, using existing excavated beach material.	Habitat degradation through construction activities.	Pen Llyn a'r Sarnau SAC	Estuaries Intertidal Mudflats and Sandflats
• Pilling and other related construction works shall occur in dry conditions only. • Pilling will cease and standing time will be implemented during high tide. • All relevant persons on site to be made aware of the mitigation and obligations in place, and to be briefed with a toolbox talk on the relevant ecological issues prior to commencement of the work. • Works shall be confined to daylight hours and no additional artificial lighting shall be used.		Pen Llyn a'r Sarnau SAC	Bottlenose dolphin Grey seal

6.0 IN-COMBINATION ASSESSMENT

6.1 Purpose

The test for likely significant effect in Regulation 63(1) of the Habitats Regulations is that effects should be assessed 'either alone *or* in combination with other plans or projects'.

For the avoidance of doubt, the Regulations identify that an in-combination assessment is required only during the screening stage and only where an impact is identified which would have an insignifcant effect on its own (a 'residual' effect) but where likely significant effect may arise cumulatively with other plans or projects.

Cumulative effects are those which make the effect more likely or more significant. Thus, where likely significant effects can be ruled out alone, there is no need for an assessment in combination because if there is no effect, it cannot add anything to an in-combination or cumulative assessment.

At the screening stage of the assessment, however, it can be difficult to distinguish between likely significant and insignificant effects where the exercise is meant to be brief. This HRA therefore assumes that any credible effect identified is assessed *alone with no residual effects.* This allows all possible effects to be captured for more detailed scrunity in the appropriate assessment.

Despite this, further scrutiny may modify this opinion and the need for an in-combination assessment may subsequently be required as described in the Handbook:

'…at a later stage when the appropriate assessment concludes that a plan or project screened as having a likely significant effect alone will not, upon further investigation, be likely to have such an effect alone, but could have such an effect in combination. In (this) situation, the approproate assessment will need to be extended, in order to address in combination effects to inform the intregrity test bearing in mind the potential for cumulative effects.'

As a result, in-combination effects are therefore considered in the appropriate assessment, which has two functions. The first function is to consider whether further scrutiny of the appropriate assessment can identify that an effect, previously identified as significant alone, was not of sufficient magnitude to justify this outcome and should have been identified as a residual effect and considered in-combination.

Secondly, it explores if possible residual adverse effects on the integrity of the site that were ruled out alone could lead to a significant adverse effect when considered in-combination. This employs best practice by considering cumulative effects at all stages of the HRA.

6.2 Approach

In the appropriate assessment stage of this HRA (see Section 5 above), adverse effects on the integrity of the European sites were ruled out for all impacts when considered alone but residual effects remained for one impact, namely habitat loss. This can be shown clearly in another version of Table 9 (Summary of Screening Exercise) above, except with only the residual effects remaining after the appropriate assessment stage with mitigation taken into account, presented as Table 14 below.

This shows that all impacts on Afon Eden – Cors Goch Trawsfynydd SAC can be ruled out from any in-combination assessment, as well as any impacts relating to pollution and disturbance of mobile species, as there were no residual effects relating to these. The in-combination assessment needs to

consider other plans and projects that could have similar effects on the features included in Table 14 below.

Table 14. Summay of Residual Effects to be Assessed In-combination with other plans and projects.

European Site	Residual Effects and Features at Risk Likely
	Habitat loss / degradation through construction works
Pen Llyn a'r Sarnau SAC	• Intertidal Mudflats and Sandflats • Estuaries

6.3 Assessment

Numerous sources of information have been reviewed in order to identify plans and projects that could potentially act in-combination with the proposed works. To keep the assessment relevant, the review of plans and projects has focussed on those that have potential to impact upon the marine / intertidal environment within the Pen Llyn and Sarnau SAC, with particular focus on areas identified as containing 'intertidal mudflat and sandflat' habitat feature along with those areas that contain 'estuaries' feature.

Data on the Wales Marine Planning Portal has been reviewed, which provides details of projects which are subject to Marine Licencing within the Pen Llyn a'r Sarnau SAC Area. Natural Resources Wales and Gwynedd Council have been consulted and plans/projects identified as being relevant are detailed below.

Nationally Significant Infrastructure Projects (NSIPs), currently identified on the Planning Inspectorate (PINS) website have been reviewed for their potential to interact with the proposed works, based on their relevance (located within Pen Llyn a' Sarnau SAC). No relevant projects were identified.

National Grid, Snowdonia Visual Improvement Provision - Afon Dwyryd Estuary

The Visual Impact Provision (VIP) Snowdonia Project is a stakeholder driven project to mitigate the visual impact of existing electricity infrastructure in nationally protected landscapes in Great Britain. The aim of the VIP Snowdonia Project is to relocate a section of overhead line underground within, and adjacent to, Snowdonia National Park. The VIP subsection is approximately 3km in length and runs from National Grid's existing Garth Sealing End Compound (SEC) near Minffordd (to the east of Porthmadog) across the Dwyryd Estuary where it enters the western edge of the Snowdonia National Park. It then continues past the small settlement of Cilfor. The Proposed Project will include the construction of a new underground cable connection (constructed within a tunnel); a new SEC and associated terminal pylon; reconfiguration of the existing Garth SEC; two new tunnel head houses and associated accesses; and removal of the existing VIP subsection (pylons and conductors).

The HRA for this scheme (Visual Impact Provision Snowdonia, Marine Habitats Regulations Assessment: Stage 1 Screening and Stage 2 Information to Inform Appropriate Assessment) identified potential impacts on the 'Atlantic Salt Meadows' feature of the Pen Llyn a'r Sarnau SAC, which also forms part of the 'Estuaries' feature of the SAC. The use of temporary access tracks and working areas has the potential to reduce the range of the Qualifying Feature. However, with the implementation of mitigation measures which include restoring habitat and establishing location of rare species in order to avoid disturbance, it is concluded that the scheme will not have an adverse effect on the integrity

of the SAC either alone or in combination with other plans or projects. No other impact on this site are included. As no residual effects from this project remain, in relation to the European sites included in Table 14 above, there is no potential for this project to act in-combination with the proposed works.

Barmouth Beach Management

Proposed small scale movement of wind blown sand from main promenade area in Barmouth. Scheme involves moving sand from promenade area, back onto beach, to a designated deposition area within the sand dunes on Barmouth Beach.

The activity will be taking place outside the Pen Llyn a'r Sarnau SAC, and the HRA (Barmouth Beach Management Habitat Regulations Assessment, YGC, December 2022) concluded that there would be no significant effect on the SAC with no residual effects. There is therefore no potential for this project to act in-combination with the proposed works.

Hafan y Mor – Construction of rock armour breakwaters

The key components of the proposed development includes changing 120m of existing linear coastal rock revetment to groynes with sand/gravel, introducing a further 210m of coastal protection made up of rock armour breakwaters with intervening areas of beach (sand/gravel) recharge, and importation of around 18,000m3 of sand, gravel and rock armour.

The HRA for this scheme (Hafan y Mor Holiday park 2030 vision masterplan – Environmnetal Statement, Habitat Regulations Appraisal – Volume 2:Appendix K, December 2019) concluded that there would be likely significant effect on the Pen Llyn a'r Sarnau SAC with the main effect being that part of the footprint of the coastal defences necessarily intrudes into the boundary of the SAC and will cover an area of sandflat that is an interest feature of the SAC. The area of direct sandflat loss is 0.15 ha (1,542 m^2). In the event of a negative assessment of the implications for a European site, under Regulation 68 of the Conservation of Habitats and Species Regulations 20178 the appropriate competent authority must secure that any necessary compensatory measures. For this project compensation measures have been developed, to address the loss of SAC intertidal habitat under the footprint of the coastal defence works. It has been agreed with NRW that compensation for the loss of SAC habitat beneath the footprint of the works would therefore involve removal of rubble (imported material which provides rudimentary coastal protection at the top of the shore) within the shingle to enhance the quality of this habitat. This shingle restoration area will cover a 2,493 m2 area of shingle to the east of the defences.

As the loss of habitat is suitably compensated for within the scope of the project, it is concluded that there is no potential for this project to act in-combination with the proposed works.

Welsh National Marine Plan (WNMP)

The HRA for this plan (Welsh National Marine Plan Habitat Regulations Assessment, August 2019), in relation to in-combination effects of other plans and projects, concludes that the wide range of external plans and programmes, and their varied approaches to HRA, ensures that attempting to define and assess specific effects at a strategic scale is not practicable to any meaningful extent. The review of plans and projects for 'in combination' effects was necessarily high level due to the strategic nature of the marine plan and the uncertainties inherent with it. 'In combination' effects will therefore need to be revisited and addressed in a more comprehensive manner at the project – level when more detailed information is available. However, the WNMP includes appropriate plan-level mitigating provisions within it that will minimise the risk of 'in combination' effects as a result of activities within the WNMP area.

No further plans or projects have been identified that could act in-combination with the residual effects of the proposed works.

6.4 Conclusion

No information was obtained that was able to suggest that there could be other plans or projects acting in-combination with the residual effects of the proposed works to create an adverse impact on the integrity of any European sites. The individual Integrity Tests for each issue evaluated in the appropriate assessment therefore stand with no need for further scrutiny and can be carried forward into the Formal Integrity Test in Section 7.

7.0 FORMAL INTEGRITY TEST / CONCLUSION

This HRA subjected the potential effects of the proposed works to an appropriate assessment and integrity test in accordance with the statutory procedures laid out in the Habitats Regulations 2017 (as amended) using methodology described in the Habitats Regulations Assessment Handbook (Tyldsley and Chapman, 2018 edition). As a result of this assessment, it can be ascertained that:

In terms of potential pollution of the adjacent estuary habitat during construction leading to degradation of habitat features and of the prey population of the otter feature of the Pen Llyn a'r Sarnau SAC and Afon Eden – Cors Goch Trawsfynydd SAC, it was considered that with mitigation in place, there would be no adverse effect on the integrity of these sites, with no residual effects.

In terms of degradation of intertidal habitat through construction activities leading to loss of intertidal habitat of the Pen Llyn a'r Sarnau SAC, it was considered that with mitigation in place, there would be no adverse effect on the integrity of the site, with no residual effects.

In terms of disturbance of mobile species during the proposed works, the assessment found that although there would be temporary increases in noise pollution during construction works, due to existing high levels of disturbance in the area and with the implementation of mitigation measures, any effects would be minimal, and there would be no adverse effects on the integrity of the sites, with no residual effects.

Although this HRA has been prepared to help the Authority discharge its duties under the Habitats Regulations, the Authority remains the competent authority and it must decide whether to adopt the conclusions and recommendations of this report, or otherwise, for the purpose of their own assessment. If accepted, consultation with the statutory nature conservation body is required.

8.0 REFERENCES

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APPENDICES

Appendix A: European sites potentially at risk (full table)

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
(1)All projects (terrestrial, marine, coastal)	Sites within which the project is wholly or partially located	Pen Llyn a'r Sarnau SAC	This criterion identifies all the European sites within the footprint of the scheme. The proposed works are within, and directly adjacent to Pen Llyn a'r Sarnau SAC	Pen Llyn a'r Sarnau SAC.
(2) Projects that could affect wetland features	(a) Sites upstream or downstream of the project location in the case of river or estuary sites (b) Open water, peatland, fen, marsh and other wetland sites with relevant hydrological links to the project, irrespective of distance from the project location	Pen Llyn a'r Sarnau SAC Meirionnydd oakwoods and Bat Sites SAC. Northern Cardigan Bay SPA Morfa Harlech and Morfa Dyffryn SAC Afon Eden – Cors Goch Trawsfynydd SAC	Effects considered are those associated with the physical presence of built development and the localised effects on surface/groundwater resources and quality, resulting from changes in run-off, sedimentation, erosion, etc. The proposed works lie within Pen Llyn a'r Sarnau SAC, a marine site (see Criterion (3) below). Morfa Harlech a Morfa Dyffryn SAC and Northern Cardigan Bay SPA are hydrologically connected. (see Criterion (3) below) The Meirionnydd Oakwoods and Bat Sites is located 12m north of the site at it's nearest point and could be susceptible to settlement of suspended dust particles during construction, however it is considered highly unlikely that this will impact upon the site's wetland features. There are no direct hydrological connections between the proposed works and the SAC. Effects on the wetland features of this site have been scoped out. Afon Eden-Cors Goch Trawsfynydd is connected by the Mawddach Estuary, located where the Afon Mawddach	See Criterion (3) below

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
			enters the estuary, c.11km upstream at its closest point. However, due to the distance of this site and its location upstream of the proposed works, effects on the wetland features of this site have been scoped out.	
(3) Projects that could affect the marine environment	Sites that could be affected by changes in water quality, currents or flows; or effects on the intertidal or sub-tidal areas, or the seabed, or marine species	Pen Llyn a'r Sarnau SAC Northern Cardigan Bay SPA Morfa Harlech and Morfa Dyffryn SAC	Effects considered are those of a wider, more strategic scale than (2) above. There is some potential for the proposed works to cause adverse pollution impacts on the immediate and surrounding Pen Llyn a'r Sarnau SAC habitats during construction. Any potential for changes in hydraulic conditions is unlikely as there is minimal change from current footprint. Morfa Harlech a Morfa Dyffryn SAC and Northern Cardigan Bay SPA are hydrologically connected, however due to the scale and nature of the works proposed and the distnaces of these sites from the proposals, any pollution impacts are unlikely.	Pen Llyn a'r Sarnau SAC
(4) Projects that could affect the coast	Sites in the same coastal 'cell', or part of the same coastal ecosystem, or where there are interrelationships with or between different physical coastal processes	See (3) above.	Effects considered are those of a wider, more strategic scale than (2) above. See (3) above.	See (3) above.
(5) Projects that could affect	Sites whose qualifying features include mobile species which	Pen Llyn a'r Sarnau SAC	This considers direct impacts of the scheme on mobile species within or outside the designated sites. Mobile	Pen Llyn a'r Sarnau SAC

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
mobile species	may be affected by the project irrespective of the location of the location of the project or whether the species would be in or out of the site when they might be affected	Meirionnydd Oakwoods and Bat Sites SAC Afon Eden – Cors Goch Trawsfynydd SAC Northern Cardigan Bay SAC	species are those considered to spend part of their life-cycle on land, in water or air beyond the designated site boundary. Typically, it focuses on potential impacts on functionally-linked land and water utilised by bird, mammals or fish associated with European sites. Note that 'indirect' effects on mobile species on functionally – linked land or water beyond the development site, is considered under other criteria below, such as '6. Recreational pressure', and '14. Disturbance'. Otter is a mobile species feature of the Pen Llyn a'r Sarnau SAC and the Afon Eden – Cors Goch Trawsfynydd SAC. Lesser horseshoe bat is a mobile species feature of the Meirionnydd Oakwoods and Bat Sites SAC. Both of these species could utilise land within or adjacent to the area of proposed works for foraging. Grey seal and bottle nose dolphin are features of the Pen Llyn a'r Sarnau SAC, which could be affected by habitat degradation and/or disturbance during construction. There is also potential for effect on the habitats of the red-throated diver feature of the Northern Cardigan Bay SAC.	Meirionnydd Oakwoods and Bat Sites SAC Afon Eden – Cors Goch Trawsfynydd SAC Northern Cardigan Bay SAC
(6) Projects that could increase recreational pressure on European sites where	(a)European sites within which the project would be wholly or partly located (b)Such European sites within an agreed zone of influence or	None	The project is not considered to increase recreational pressure on European sites. Therefore, direct effects on European sites from increased recreational pressure can be ruled out of any further consideration.	None

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
qualifying features are sensitive to such pressures	other reasonable and evidence-based travel distance of the project location that may be affected by local recreational or other visitor pressure generated by the project (c) Such European sites within an agreed zone of influence or other evidence-based longer travel distance of the project, which are major (regional or national) visitor attractions such as European sites which are National Nature Reserves where public visiting is promoted, sites in National Parks, coastal sites and sites in other major tourist or visitor destinations			
(7) Projects which could increase the amount of	(a) Sites that are used for, or could be affected by, water abstraction irrespective of distance from the project	None	The proposed works would not comprise of any such activities. Therefore, direct effects on European sites from increased development can be ruled out of any further consideration.	None

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
development	(b) Sites used for, or could be affected by, discharge of effluent from wastewater treatment works or other waste management streams serving the project, irrespective of distance from the project			
	(c) Sites that could be affected by the provision of new or extended transport or other infrastructure			
	(d) Sites that could be affected by increased deposition of air pollution arising from the proposals, including emissions from significant increases in traffic			
(8) Projects comprising linear developments or infrastructure	Sites within a specified distance from the centre line of the proposed route (or alternative routes), the distance may be varied for differing types of site/qualifying features and in the absence of established good practice standards, distances(s) to be agreed by the statutory conservation body	None	This HRA has adopted a 10km radius in which to evaluate the potential impacts of the proposed works. Individual effects are identified in other criteria. This criterion does not identify the types of potential impacts which are, instead, more closely defined by other criteria as listed above or below. Therefore, column 5 has been left blank as attention is drawn to more specific criteria.	See other criteria
(9) Projects that	Sites considered to have	None	The project is not considered to introduce new activities or	None

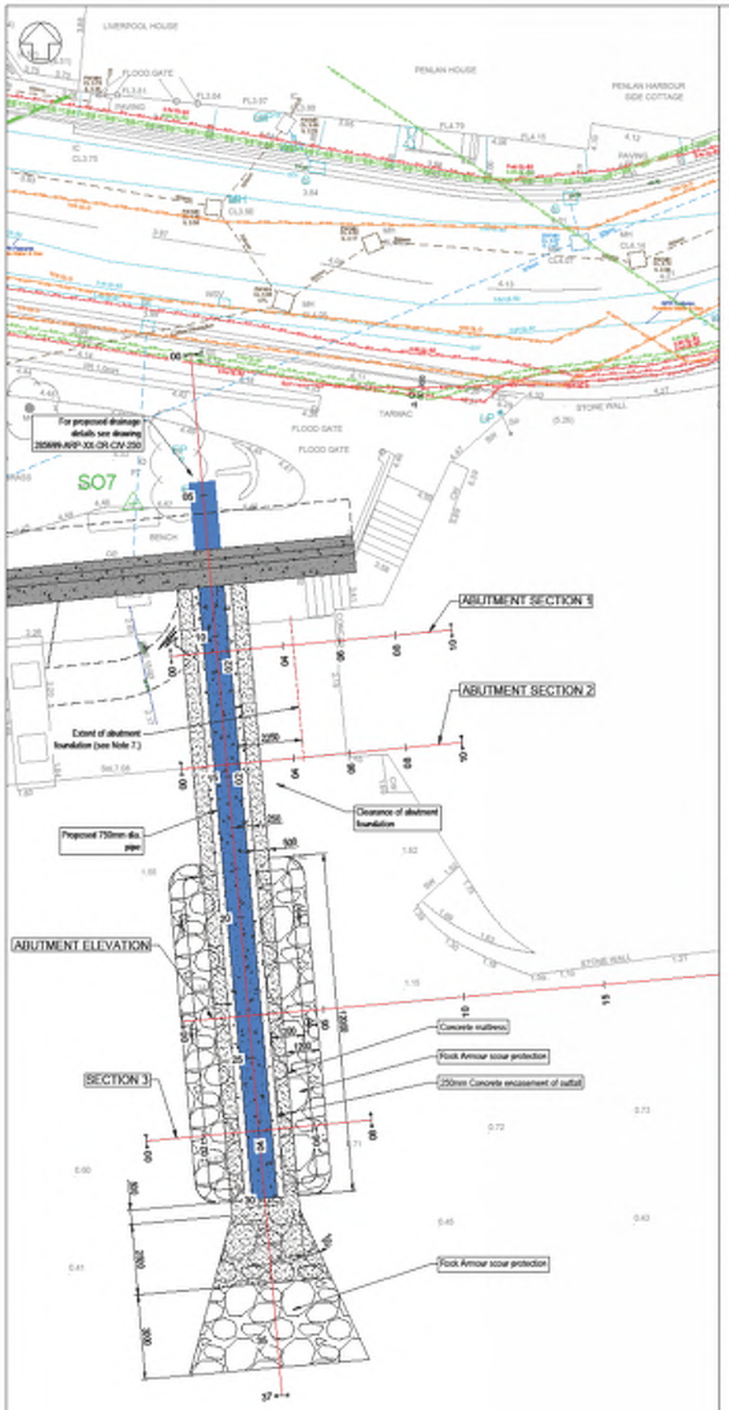
Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
introduce new activities or new uses into the marine, coastal or terrestrial environment	qualifying features potentially vulnerable or sensitive to the effects of the new activities proposed by the project		uses into the environment.	
(10) Projects that could change the nature, area, extent, intensity, density, timing or scale of existing activities or uses	Sites considered to have qualifying features potentially vulnerable or sensitive to the effects of the changes to existing activities proposed by the project	None	The project is not considered to change the nature, area, extent, intensity, density, timing or scale of existing activites or uses in a way that would pose a threat to any habitat or species features of the protected sites.	None
(11) Projects that could change the quantity, quality, timing, treatment or mitigation of emissions or discharges to air, water or soil harvested, extracted or consumed	Sites considered to have qualifying features potentially vulnerable or sensitive to the changes in emissions or discharges that could arise as a result of the project, over and above those already identified	None	The project is not considered to change the the quantity, quality, timing, treatment or mitigation of any emissions or discharges to air, water or soil harvested, extracted or consumed.	None
(12) Projects	Sites whose qualifying features	None	No such activities are proposed and changes to biological	None

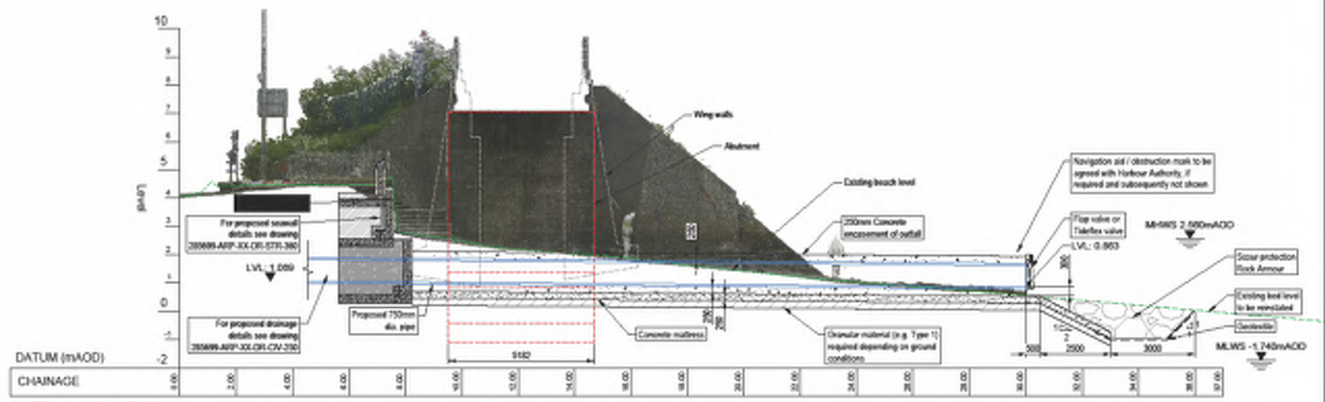
Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
that could change the quantity, volume, timing, rate or other characteristics of biological resources harvested, extracted or consumed	include the biological resources which the project may affect, or whose qualifying features depend on the biological resources which the project may affect, for example prey species or supporting habitat which may be disturbed by the harvesting, extraction or consumption		resources that might affect qualifying features on all European sites listed can be ruled out of any further consideration.	
(13) Projects that could change the quantity, volume, timing, rate, or other characteristics of physical resources extracted or consumed	Sites whose qualifying features rely on the physical resources which the project may affect, for example, as habitat or a physical environment on which habitat may develop or which may be disturbed by the extraction or consumption	None	The proposed works would not cause changes to any physical resources extracted or consumed.	None
(14) Projects which could introduce or increase, or alter the timing, nature or location of disturbance to species	Sites whose qualifying features are considered to be potentially sensitive to disturbance, for example as a result of noise, activity or movement or the presence of disturbing features that could be brought about by the project	Pen Llyn a'r Sarnau SAC Meirionnydd Oakwoods and Bat Sites SAC Afon Eden – Cors Goch Trawsfynydd SAC	There is a small risk of disturbance to otters, a qualifying feature of the Pen Llyn a'r Sarnau SAC and Afon Eden – Cors Goch Trawsfynydd SAC, during construction. Similarly, the proposed works could lead to disturbance of grey seal and bottlenose dolphin feature of the Pen lLyn a'r Sarnau SAC. Lesser Horseshoe Bats is a mobile species feature of Meirionnydd Oakwoods and Bat sites SAC. There may be a small risk of temporary disturbance during construction	Pen Llyn a'r Sarnau SAC Afon Eden – Cors Goch Trawsfynydd SAC Meirionnydd Oakwoods and Bat Sites SAC

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
			phase. There are no cofnod records of Lesser Horseshoe Bat roosts within 1km of the proposed works.	
(15) Projects which could introduce or increase or change the timing, nature or location of light or noise pollution	Sites whose qualifying features are considered to be potentially sensitive to the effects of changes in light or noise that could be brought about by the project	Pen Llyn a'r Sarnau SAC Afon Eden – Cors Goch Trawsfynydd SAC Meirionnydd Oakwoods and Bat Sites SAC	There would be some localised temporary noise pollution during the construction period, which could potentially cause a low level of disturbance to otters, grey seal and bottlenose dolphin features of the Pen Llyn a'r Sarnau SAC. However, this would be minimal as there is already a degree of disturbance in the vicinity of the proposals. Works would also be undertaken during daylight hours when otter activity is minimal. There would be no additional artificial lighting of the site. As above, the proposed works are likely to create a temporary increase in noise levels during the course of the works, potentially impacting lesser horseshoe bats. Cofnod records do not indicate the presence of a lesser horseshoe bat roost within 1km of the proposed works. Effects on foraging bats would be minimal as works will be undertaken during daylight hours and there would be no artificial lighting of the site.	Pen Llyn a'r Sarnau SAC Afon Eden – Cors Goch Trawsfynydd SAC Meirionnydd Oakwoods and Bat Sites SAC
(16) Projects which could introduce or increase a potential cause of mortality of species	Sites whose qualifying features are considered to be potentially sensitive to the source of new or increased mortality that could be brought about by the project	None	The project would not introduce or increase a potential cause of mortality of species.	None

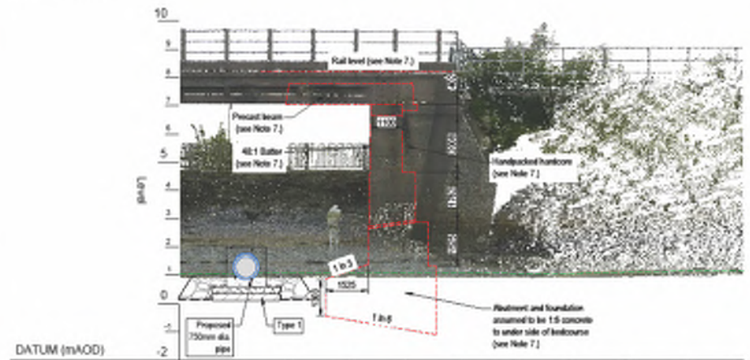
Extract from *The Habitats Regulations Assessment Handbook*,
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Appendix B: Site Plans

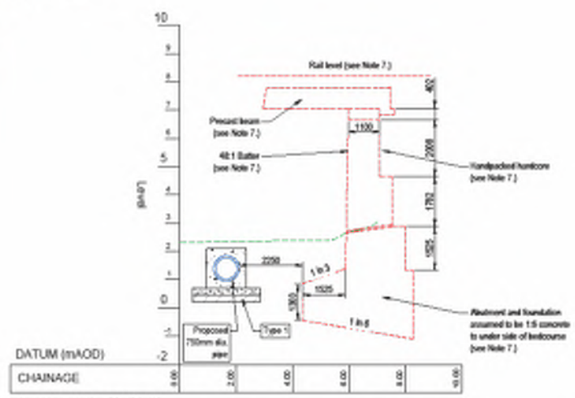




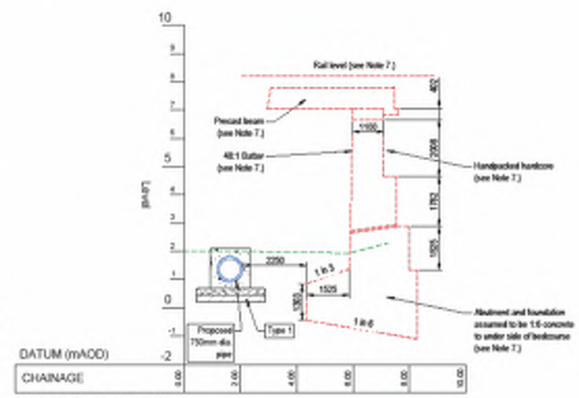
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SCALE: 1:100



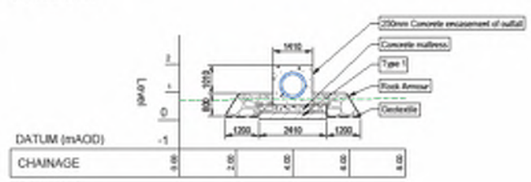
ABUTMENT ELEVATION
SCALE: 1:100



ABUTMENT SECTION 1
SCALE: 1:100



ABUTMENT SECTION 2
SCALE: 1:100



SECTION 3
SCALE: 1:100

SCALE 1:100 (m)

A1

Nodiadau i Nodiadau / Notes

1. All dimensions are in millimetres unless noted otherwise.
2. All levels are in metres relative to ordnance datum Newlyn (mAOD) unless noted otherwise.
3. All coordinates are in metres relative to ordnance survey national grid.
4. Do not scale from this drawing. All dimensions must be checked / verified on site.
5. Refer to P/422/4427 Barmouth Viaduct Gardens Factual Report on Ground Investigation, Geotechnics (February 2023).
6. Outfall to extend on the foreshore until invert level is 300mm above bed level (minimum).
7. Abutment shown as derived from historical drawing of Barmouth Reconstruction of Old Chapel Viaduct Substructure.

Legend

- Information derived from historical drawings (see Note 7.)
- Existing beach level

Tide Levels

Datum	mAOD
HAT	3.26
MHWS	2.56
MHWN	1.28
MSL	0.26
MLWN	-0.54
MLWS	-1.74
LAT	-2.14

Hanes Fersiwn / Version History

Rev	Date	By	Check	Approved
P02	08.06.23	CF	DO	RM
DRAFT FOR COMMENT				
P01	31.05.23	CF	DO	RM
DRAFT FOR COMMENT				

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Cleient / Client

YGC

Enw a Rhif y Prosiect Cynghorydd / Cynnedd Council Project Name and Number

Cynllun arfordirol Gerddi Traphont

Viaduct Gardens Coastal Scheme

Teitl Lluniad / Drawing Title

Proposed Drainage Sections - New Outfall

Graddfa yn A1 / Scale at A1

AS SHOWN @ A1

Rhan / Role

Civil Engineer

Addasrwydd / Suitability	Statws / Status
For Information	S2
Rhif y Prosiect Arup / Arup Project Number	Addasiad / Rev
285699-00	P02

Rhif y Lluniad / Drawing Number

285699-ARP-XX-DR-CIV-250

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A1

Site Plan
Scale 1:100

Existing extent of Rock Armour omitted for clarity

Rock Armour crest

Indicative beach level against Rock Armour

Rock Armour toeing

Alignment of face of existing seawall

Raised insitu wall - Stone masonry wall with insitu RC core and coping

10 mm gap (sets position of upper wall)

Upper precast units - Rockwall precast RC retaining wall unit with stone masonry facing

Lower precast units - Rockwall precast RC retaining wall unit with stone masonry facing

Insitu RC foundation to raised insitu wall

Class 6N graded free draining backfill to dcc series 600, compacted in 150mm layers

150 mm land drain to single outfall with flap valve in front of wall

Insitu RC foundation to upper precast unit

M20 SS anchors

Mass concrete infill to lower precast unit

Insitu RC foundation to lower precast unit

Rock Armour scour protection

Geotextile

Seawall general cross-section
Scale 1:25

PIER 1 - 1.761

OFFSET	-5.00	-4.00	-3.00	-2.00	-1.00	0.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
EXISTING GROUND	4.40	4.41	4.42	4.42	2.95	2.34	1.93	1.31	0.93	0.81	0.89	0.85	0.53	0.44	0.36	0.34

SCALE 1:25 (mm)

SCALE 1:100 (m)

Nodiadau / Notes

1. All dimensions are in millimetres unless noted otherwise.
2. All levels are in metres relative to ordnance datum Newlyn (mAOD) unless noted otherwise.
3. All coordinates are in metres relative to ordnance survey national grid.
4. Do not scale from this drawing. All dimensions must be checked / verified on site.
5. Rock Armour scour protection in front of new wall to re-use existing rocks, assumed 280t of 600-800mm (0.5-1.9t) material with Dn50=0.75m. Existing rocks to be placed on top layer and western end of frontage and imported rock armour of 0.3-1t grading is required to complete works. Layout assumes layer coefficient Kt=0.9. Existing bed levels to be reinstated post construction of scour protection.

Legend

- Existing surface derived from topo
- Existing surface derived from point cloud
- Existing information derived from historic drawings

Hanes Fersiwn / Version History

Rev	Date	By	Chkd	Apprd
P01	31.05.23	CF	JB	BM

DRAFT FOR COMMENT

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Cleient / Client

YGC

Enw a Rhif y Prosiect Cynghorol / Cynnist Council Project Name and Number

Cynllun arfordirol Gerddi Traphont

Viaduct Gardens Coastal Scheme

Teitl Llunied / Drawing Title

Proposed Seawall Details - Typical Section

Graddfa yn A1 / Scale at A1

AS SHOWN @ A1

Rhan / Role

Civil Engineer

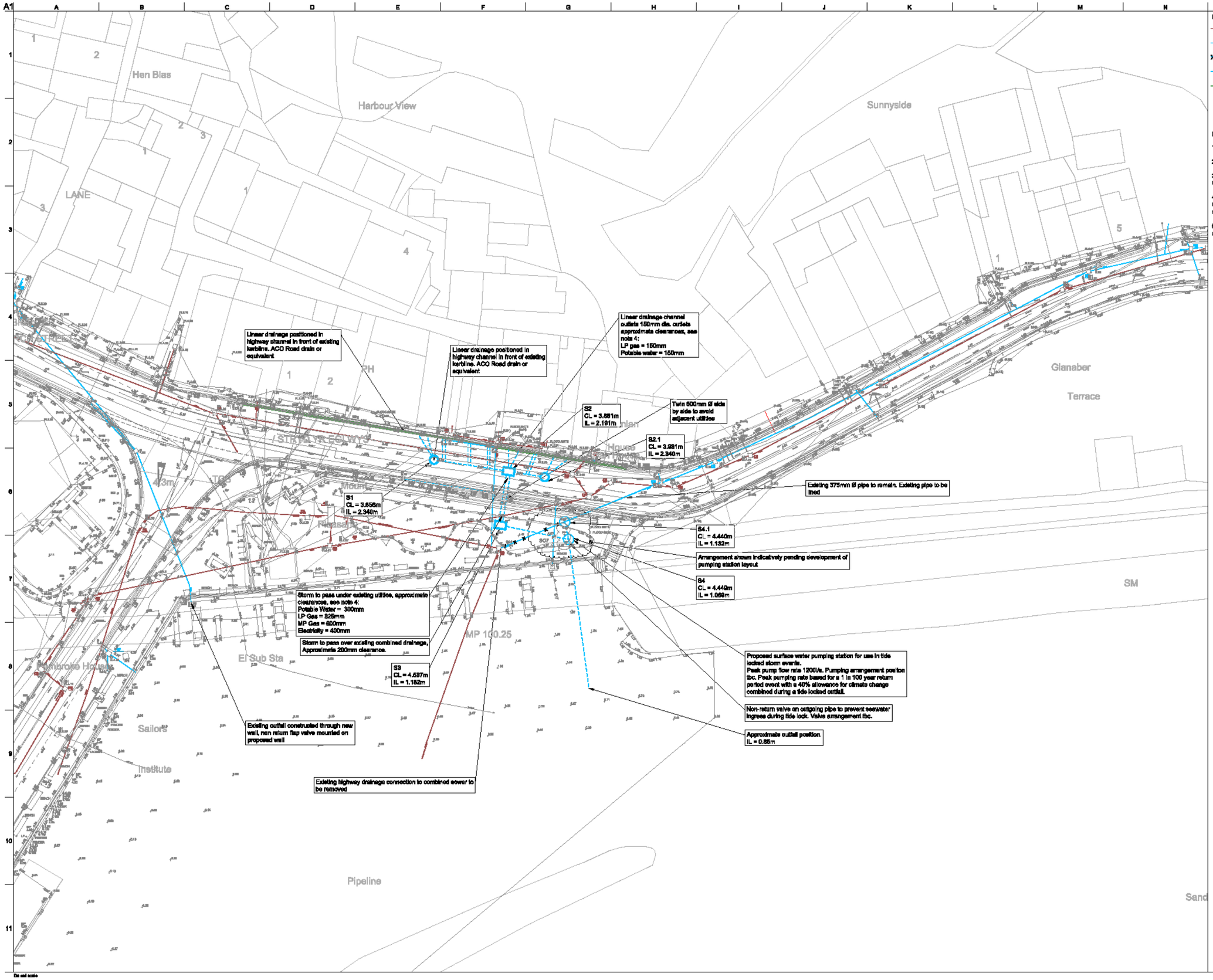
Addasrwydd / Suitability	Statws / Status
For Information	S2
Rhif y Prosiect Arup / Arup Project Number	Addasiad / Rev
285699-00	P01

Rhif y Llunied / Drawing Number

285699-ARP-XX-DR-STR-360

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Mae'r cynllun a'r lluniad yma yn gyfrinachol. Mae pob hawl sydd ynddi neu ynddynt yn eiddo i Cyngor Gwynedd ac ni ddylid ei ddatgelu i neb(au) heb ganiatâd ysgrifenedig gan Cyngor Gwynedd 2022.
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Issue	Date	By	Chkd	Appd

ARUP

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Client

Job Title

Proposed Storm Drainage
General Arrangement

DRAFT

Scale at A1 1:250

Discipline S3

Job No

Drawing Status Draft

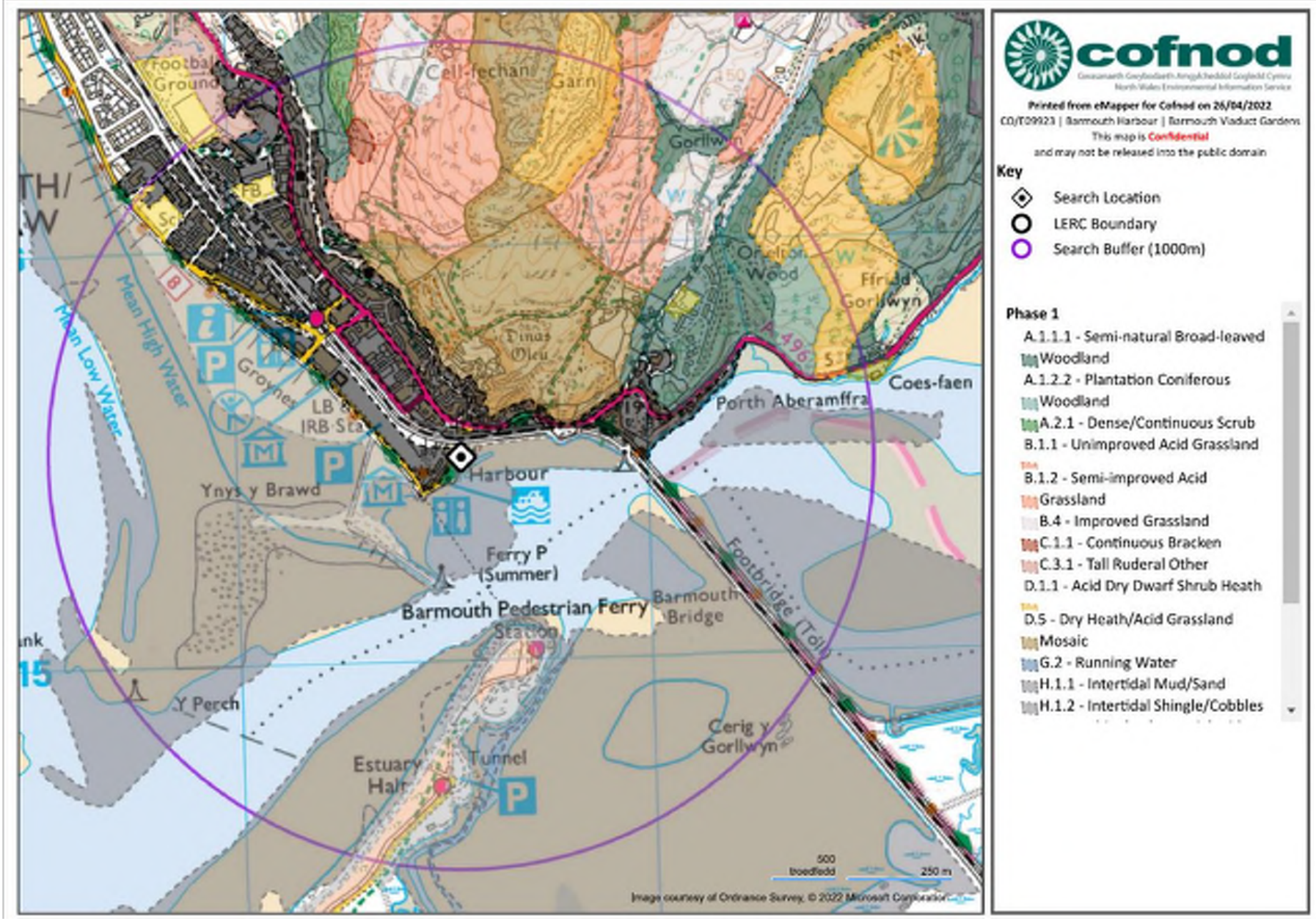
Drawing No 285699-ARP-XX-DR-CIV-250

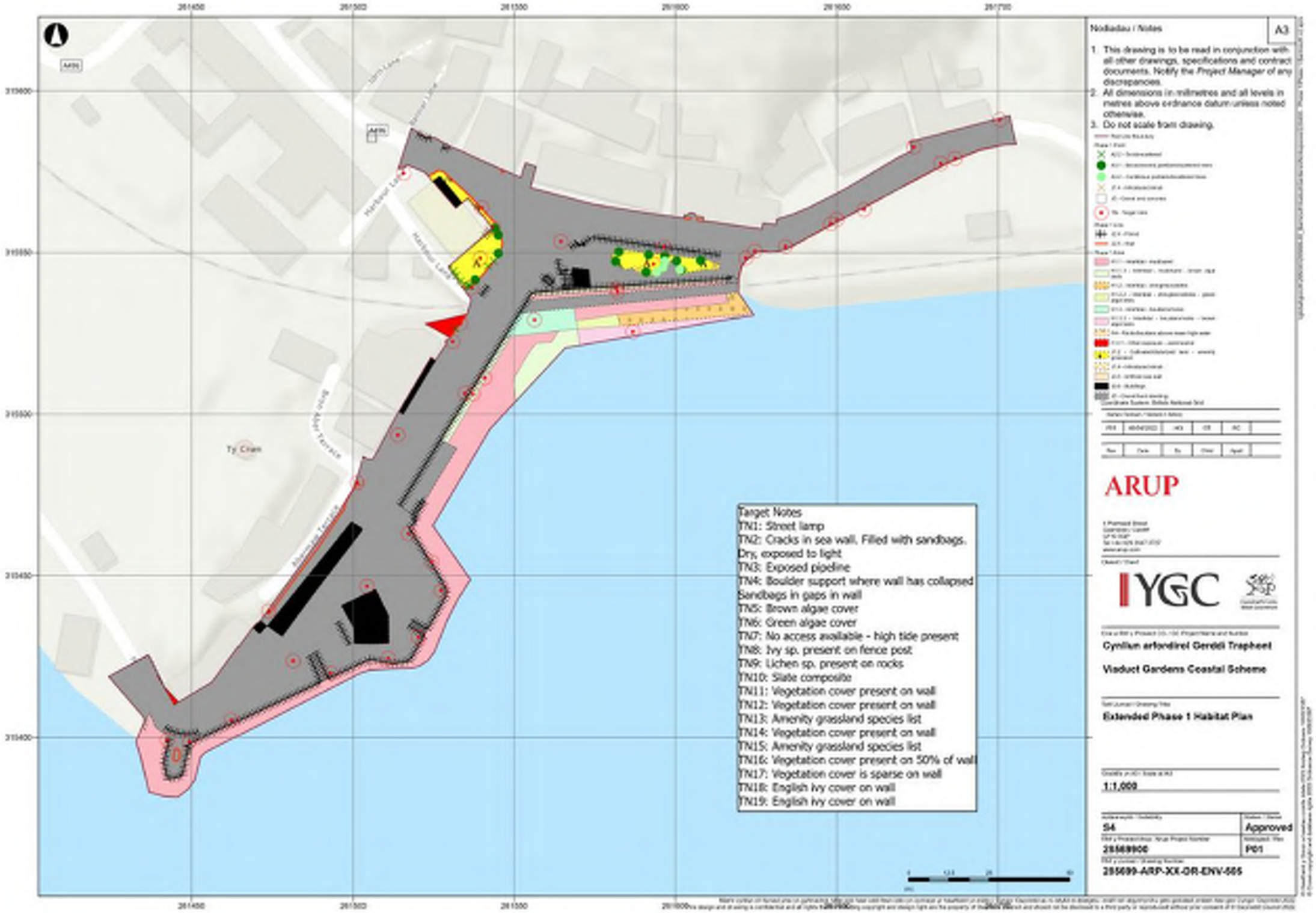
Issue

Do not scale

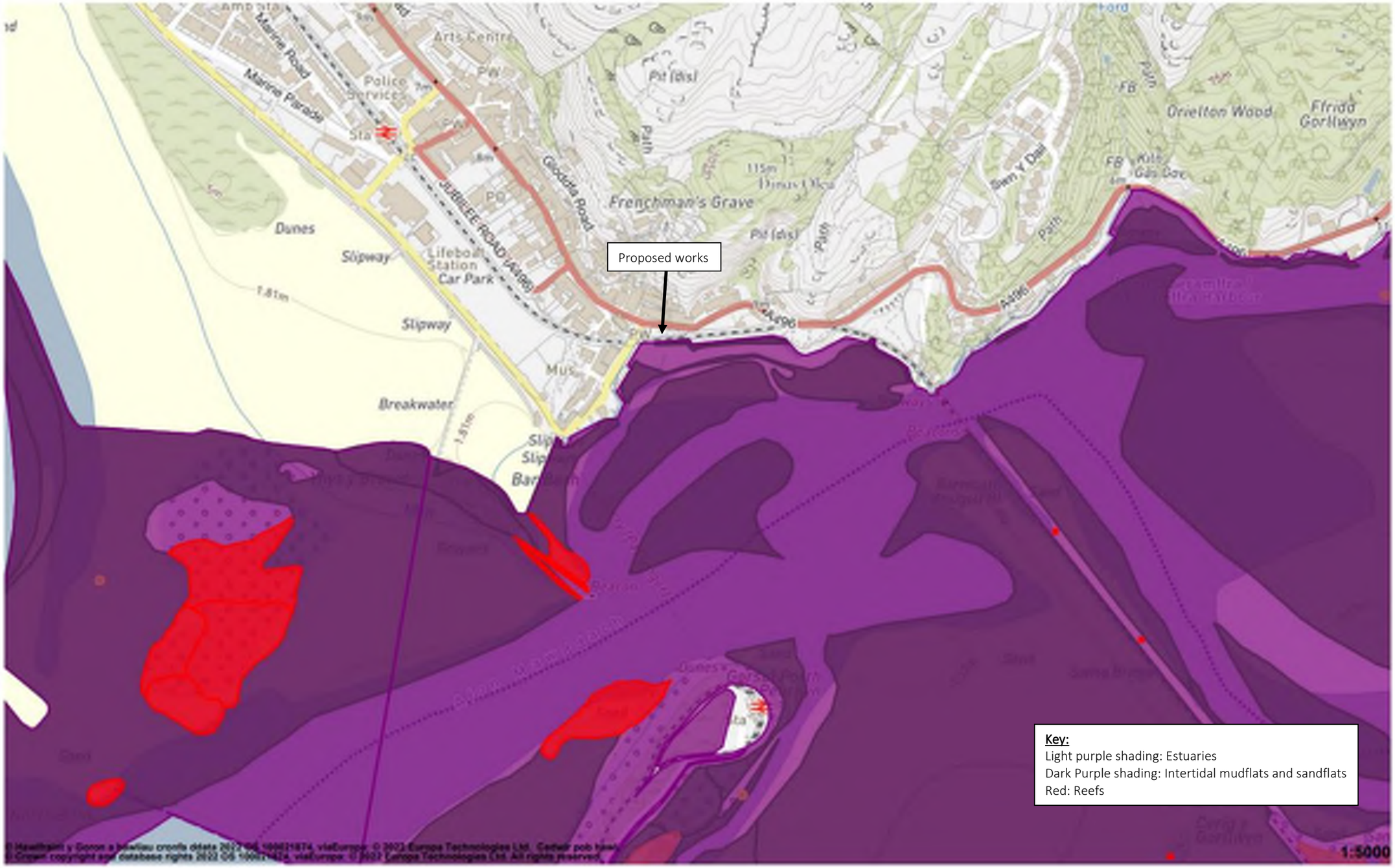
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Appendix C – Phase 1 Habitat plans




261450
261500
261550
261600
261650
261700
315600
315550
315500
315450
315400
A470
Harbour Lane
Harbour Lane
Ty Crwn
Alexandra Terrace
Target Notes
TN1: Street lamp
TN2: Cracks in sea wall, Filled with sandbags. Dry, exposed to light
TN3: Exposed pipeline
TN4: Boulder support where wall has collapsed Sandbags in gaps in wall
TN5: Brown algae cover
TN6: Green algae cover
TN7: No access available - high tide present
TN8: Ivy sp. present on fence post
TN9: Lichen sp. present on rocks
TN10: Slate composite
TN11: Vegetation cover present on wall
TN12: Vegetation cover present on wall
TN13: Amenity grassland species list
TN14: Vegetation cover present on wall
TN15: Amenity grassland species list
TN16: Vegetation cover present on 50% of wall
TN17: Vegetation cover is sparse on wall
TN18: English ivy cover on wall
TN19: English ivy cover on wall
Nodiadau / Notes
A3
1. This drawing is to be read in conjunction with all other drawings, specifications and contract documents. Notify the Project Manager of any discrepancies.
2. All dimensions in millimetres and all levels in metres above ordnance datum unless noted otherwise.
3. Do not scale from drawing.
ARUP
YGC
Cynllun arfondirol Gerddi Traphont
Viaduct Gardens Coastal Scheme
Extended Phase 1 Habitat Plan
1:1,000
S4
Approved
285689/00
P01
285689-ARP-XX-DR-ENV-005

Marine SAC features



03/10/2022

Marine SAC habitat features of Pen Llyn a'r Sarnau SAC. (Source: Data Map Wales).

Appendix D: Aerial plan



October 3, 2022

1:1,500

0 0.01 0.03 0.05 mi

0 0.02 0.04 0.08 km

MapGwynedd, Gwynedd

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Appendix E: Site Photographs



1. Viaduct Gardens frontage wall, looking west across the proposed works area.



2. Looking west across the proposed works area.



3. Looking towards the western extent of the works area.



4. Viaduct Gardens area, north of the frontage wall.



5. Western extent of frontage wall.



6. Central section of frontage wall



7. Central section of frontage wall



8. Eastern extent of frontage wall



9. Looking east along frontage wall



10. Western extent



11. Eastern extent

Appendix F – Construction Methodology

Viaduct Gardens Construction methodology (Limited to works on wall and Outfall)

Sequence of Works

Wall Works

a) Access to the wall at beach level

a. Access to the seaward side of the wall will be via an existing ramp approx. 50m away from the wall.

b. Access is shared with current harbour activities.



c. Plant using this access rout will return to the top of the ram storage area at the end of each shift.

d. Typical plant that will use this route will be tracked excavator and tracked dumper. Wheeled duper may be used if beach condition allows.

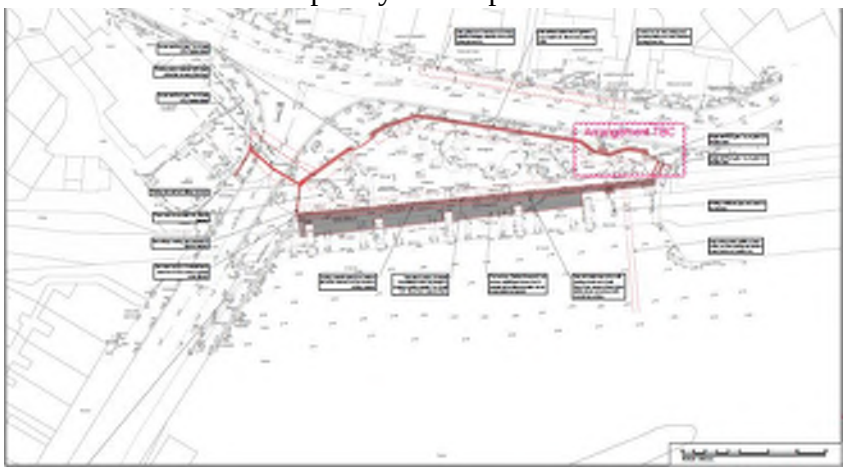
e. Majority of the works will be caried out from the viaduct garden side of the wall to avoid marine working.

b) Temporary works

a. Prior to dismantling the existing wall , some temporary support works will be required to stabile the structure and existing filled garden areas.
b. Sheet piling or king post walls will be used to support the embankment .
c. Installation of these will be manly form the Viaduct Garden side of the wall , with possible assistance form the back with an excavator.
d. Current wall and beach rock armour will remain in place during installation of temporary works.
e. Scaffolding may be required at the end of the works to construct the wall parapet . Scaffold poles may need to extend to beach level.
f. Existing surface water drainage outfalls will be maintained as active throughout the works until it is swapped over to the permanent works. Some minor over pumping may need to be carried out during wall construction with water pumped from the nearest upstream manhole from the outfall. Water will be pumped onto rock armour to prevent scour.

c) Existing wall demolition / Removal

a. Exiting wall will be demolished in sections with exposed wall dependant of extent of temporary works protection to the embankment.

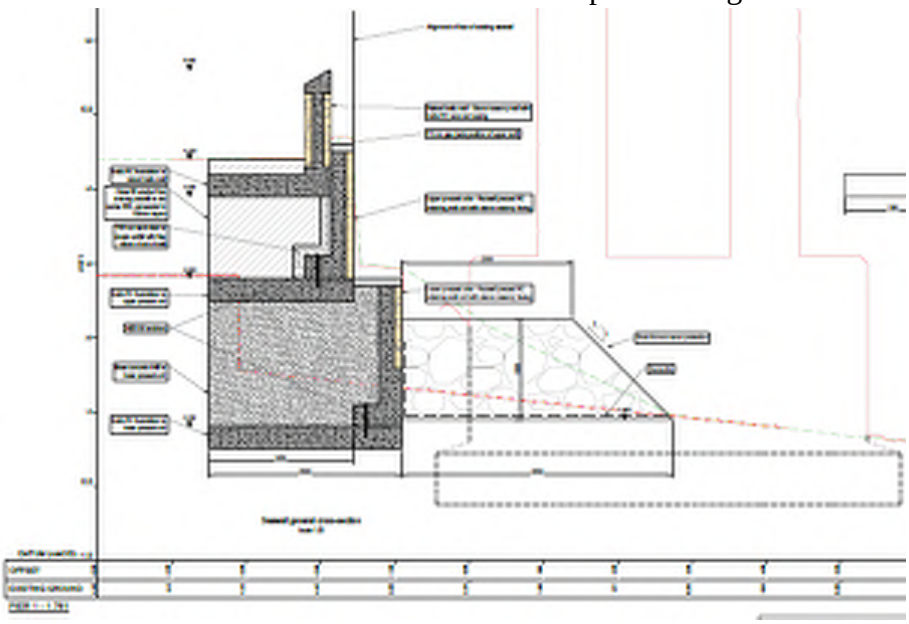


b. Existing rock armour at the toe of the wall will be moved back form the wall to expose the face - this material along with some additional armour as required will be re used as armour on completion of the new wall.
c. Upper part of stone wall will be removed and take into the gardens side of the wall for re use in the parapet.
d. Lower part of wall will be excavated down to the beach and loaded away for disposal or re-used as armour if suitable.
e. Excavation from behind the stone facing, to the temporary support will be loaded onto duper and taken away for disposal. Tis material is expected to be sand & gravel and only small amount to be retained as backfill if necessary to the gardens side.
f. Existing piped outfalls will have temporary supports as necessary.

g. Existing Electrical cable will be temporarily protected dusting this works.
h. Excavation work to the last 500mm to formation level will be done “just in time” to receive in situ concrete base slab.

d) Wall foundations

a. Wall foundation will be cast in situ as per drawing detail below



b. Concrete will be poured by skip or pump from the garden side of the wall (top of wall)
c. Concrete pour will be done early in shift to allow curing before next tide , with time times and heights monitored for the activity.
d. Pour length will match temporary support location / length installed for the embankment.
e. Existing rock armour will be positioned just other side of viaduct foundations to act as shelter , this may be reinforced with excavated sand / beach materials for the foundation dig.

e) Precast Wall

a. Top and middle sections will be PCC L shaped units as shown in the drawing above .
b. PCC units will be laid directly on the base in situ slab once cured. With the PCC unit anchored into the base slab using grouted in dowels.
c. PCC unit will be craned in by an excavator , either form the top of the embankment or from the bottom , dependant on working space around existing structures.
d. Once the lower unit is in place and anchored then joints will be sealed ready for the in-situ concrete backfill.
e. Temporary end shutters will be placed at the sections to be poured.
f. Concrete will be placed using pump or skip for the top of the wall.
g. Once the bas unit is in place and backfilled the wall will then no longer be tidal condition susceptible.

h. Middle wall (PCC) will be installed in same manner.
i. Backfill for middle wall will be done form the gardens side of the wall with placement and compaction carried out in thin layers.
j. Upper part of wall and where new and existing outfalls will be cast in situ.

f) Cast in situ sections

a. Areas where existing and new pipework / cabling protrude the wall will be cast in situ in lieu of using PCC units , this is to ensure flexibility in locating the pipe/ cable around the new wall.
b. One whole section of PCC unit will be left out and a shutter placed either side of the PCC unit – in situ sections will be 1.0 - 1.5m long.
c. In situ section will have reinforcement and will tie into the PCC units with dwells or similar.
d. In situ sections will be stone faced to match surrounding precast units with facing tied in with anchors to the concrete
e. Concrete pours for the will be done using pump or skip for the top of the wall.
f. There are approx. 2-3 areas where this method will be used. If pip sis only n lower section, then middle section can return to the PCC wall method and vice versa. This will minimise in situ concrete works.

g) In situ parapet wall

a. The parapet wall will be installed as an in-situ wall once the lower and mid sections are complete.
b. Base slab will be poured form the gardens side of wall , and rebar installed as starter bars.
c. Two stone walls facing will be built , with the middle of the wall being infilled with concrete .
d. Coping will be in situ concrete as shown on previous drawing. Access to the parapet will be mainly form the garden , with scaffold used on the seaward side.

h) Rock Armour

a. On completion of the lower and middle wall , access form the beach side will no longer be required , therefore the permanent rock armour can be installed.
b. Previously removed armour stored at beach level will be placed by excavator on the geotextile laid against the new wall .
c. Additional armour will delivered to the harbour side by road wagon and transferred to temporary stockpile.
d. Additional armour as required , will be brought to the wall using a dumper , with

e. Armour will be pace to profile as shown in the drawing above with care undertaken during placement around the viaduct foundations.
f. Beach will be reinstated around the viaduct and any waste/undersized armour removed or used as rip rap within the armour section.

Pipe outfall works

a) Temp works

a. Existing piped outfall will remain operational until new system is complete.
b. Rock armour excavated from the wall works may be used to protect the new piped outfall area during excavation and concrete works as a temporary measure . This bund may also be reinforced using excavated beach materials from the pipe works.

b) Pipe work installation

a. The new outfall pipe will be a 750mm diameter pipe and will protrude approx. 22m from the new wall face.

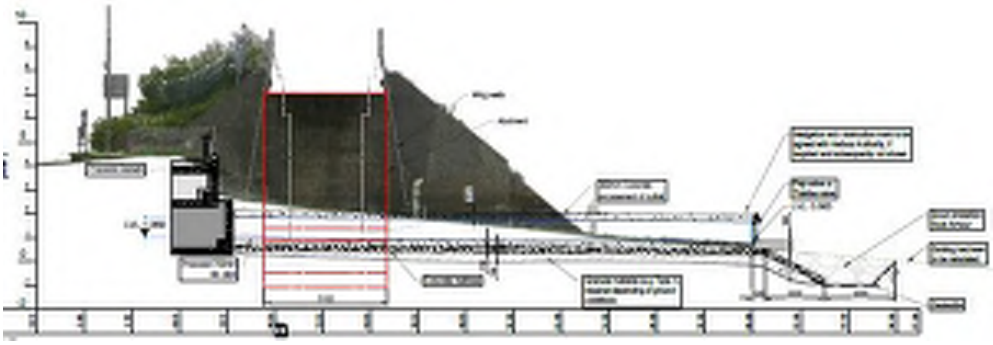


b. Timing of the works will be to coincide with good weather and low tides as excavation work vary but go as low as approx.. -0.5 Aod.
c. Pipework protruding through the new wall will have been previously installed with coupler inserted into the new wall
d. The beach material for the bed will be excavated out and new granular layer placed to provide a firm profile for the pipework , with material brough in by dumper across the beach.
e. Placement of the concrete mattress will be done when tides and Werther conditions are favourable , with accelerators considered to be used to ensure the concrete cures before next tide.

f. Pipework will be laid on the mattress on spacers to allow for the concrete surround to be placed.
g. Pipe will be coupled together in a sealed system . Pipe work will likely to be plastic material , with pipes rough to the works are down the ramp and across the beach
h. Temporary anchors will be pit on the pipe so it remains in correct position until surround is placed

c) Concrete surround

a. Once the bed mattress is cured, then the pipe will be laid to the line and level as shown in the drawing below



b. Pipe is to be fully bedded and surrounded in 250mm thick concrete.
c. Shutters will be placed either side of the pipe and anchored to the concrete mattress.
d. Concrete will either be pumped to works area or brough in with dumper and place with excavator.
e. Shutters will be removed once concrete is cured and take off site .

d) Outfall detail

a. The anti-scour basin will be constructed once the pipe is fully surrounded in concrete.
b. Rock armour will be paced in the end by excavator with material brough in by dumper along the beach.
c. A bolt on flap valve or tide vale will the installed at the end of the pipework
d. Once complete any rock armour used as temporary protection will be removed and taken back to the wall as permanent works.
e. Beach levels will be restored round the new pipe and ant debris form the works cleared away .